Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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Commercial Fisheries Abstracts

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0	General and theoretical	5	Vitamins
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4	Oils	9	Miscellaneous

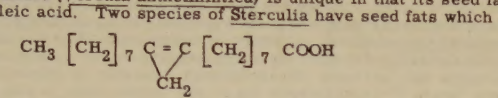
Issued with the approval of the Bureau of the Budget, December 29, 1953

4.10 CONVENTIONAL AND UNCONVENTIONAL FEATURES IN THE COMPOSITION OF SOME NATURAL FATS

Hilditch, T. P.
Chemistry and Industry, No. 28, 807-808 (July 10, 1954)

The fatty acids found in the glycerides of natural fats are remarkably uniform in kind over wide ranges of biological species. The particular acids, however, vary in fats of different biological origin. Linoleic and oleic acid together make up about 80% and palmitic acid about 7 or 8% of all the seed fatty acids found in nature. All of the other natural fatty acids found in the various seed fats therefore amount to only about 12 to 15% of the total. Linoleic, oleic, and palmitic acids are major components of the seed fats of many trees and shrubs.

Some of the rare fatty acids are characteristic components of the seed fats of specific families. Erucic ($C_{22}H_{42}O_2$) is found in Cruciferae, octadec-t-enoic (petroselinic), in Umbelliferae, stearic, in a few tropical plant families, and lauric and/or myristic in Palmae, Lauraeceae or Myristicaceae. A species of fleabane (Veronia anthelmintica) is unique in that its seed fatty acids contain over 70% of 12, 13-epoxy-oleic acid. Two species of Sterculia have seed fats which contain 70% of



The conjugated elaeostearic acid occurs in a few species of Euphorbiaceae and Rosaceae, whereas ricinoleic acid occurs only in Ricinus (castor oil, which contains 90% ricinoleic acid).

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4.21 STUDIES ON THE MECHANISM OF VITAMIN E ACTION. II. INHIBITION OF UNSATURATED FATTY ACID OXIDATION CATALYZED BY HEMATIN COMPOUNDS

Tappel, A. L. (University of California)
Archives of Biochemistry and Biophysics 50, No. 2, 473-485 (June 1954)

Further studies have been conducted to determine if vitamin E serves as an inhibitor of unsaturated fatty acid oxidation that is catalyzed by hematin compounds. Methylene blue, thionine, and structural analogs of other substances showing in vivo vitamin E activity strongly inhibit hemin, hemoglobin, and cytochrome c-catalyzed oleic acid oxidation. Although methylene blue is not an unsaturated fat antioxidant, it inhibits the hemin-catalyzed oxidation of two naturally occurring triglycerides that contain a predominant amount of unsaturated fatty acids. Oxidation inhibition by methylene blue, thionine, tryptophan, histidine, and nicotine apparently involves a direct combination of the inhibitor through a nitrogen atom with the catalytically active iron atom of the iron porphyrin group to form hemochromes or hemichromes. Judging from these observations the in vivo activity of methylene blue, thionine, and antabuse could be due to a direct reaction that inhibits a catalytically active hematin compound. Vitamin E action, therefore, may inhibit hematin catalysis.

Vitamin E or α-tocopherol and other phenolic antioxidants that are able to destroy fat peroxides and to prevent their formation inhibit hematin catalysis in a different manner than methylene blue and its related compounds. The initiation of hematin-catalyzed, free- radical chain-reaction oxidation can be prevented if the necessary precursor for peroxidative hematin catalysis is eliminated. Many types of cooxidation can be observed during hematin-catalyzed unsaturated fat oxidation. Hemoglobin, cytochrome c, and hemin destruction can be observed visually. Another example of a destructive reaction catalyzed by hematin compounds is the cooxidation of vitamin A and carotene. This study

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5.122 ASPECTS OF THE MODE OF ACTION OF VITAMIN A

Morton, R. A.
Chemistry and Industry, No. 28, 809 (July 10, 1954)

Vitamin A became a subject for study when it was recognized as an accessory food factor for promoting normal growth. Bio-assay methods, color tests, and ultra-violet absorption spectra for vitamin A all led to the discovery of carotenoid precursors (provitamins A) and to the isolation and characterization of vitamin A_1 and A_2. The chemical structures for the various forms of vitamin A have been confirmed and, as a result, pure synthetic vitamin A and vitamin A acetate are now available for commercial use.

For convenience the biological functions of vitamin A should be considered under (1) functions concerned with vision, and (2) functions concerned with the growth-promoting systemic role associated with the maintenance of normal epithelial tissue. The indication of a vitamin A deficiency is in the first instance defective low-intensity (scotopic) vision and in the second instance xerophthalmia (soreness and inflammation around the eyes and particularly the eyelids).

The progress that has been made in the chemistry and biochemistry of vision is considerable. Rhodopsin, the photosensitive conjugated protein that can be obtained from retinal rods, yields a substance called retinene$_1$, which was discovered by Wald in 1935. This substance was later recognized at Liverpool as vitamin A aldehyde. It was subsequently found that the aldehyde could be made merely by allowing a solution of vitamin A (alcohol) in light petroleum to stand in the presence of solid MnO_2. This process made retinene easily accessible. That vitamin A and retinene$_1$ were integral parts of light-sensitive materials concerned with vision now became apparent. Students of vitamin A chemistry, therefore, assumed that the mode of action of vitamin A in other sites in the

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4.99 STUDIES ON ENCEPHALOMALACIA IN THE CHICK. 4. THE INFLUENCE OF OIL IN FISH MEAL AND OILS FROM VARIOUS SPECIES OF FISH ON THE INCIDENCE OF ENCEPHALOMALACIA

Singsen, E. P.; Potter, L. M.; Matterson, L. D.; Bunnell, R. H.; Kozeff, Anna; and Jungherr, E. L.
Poultry Science 33, No. 5, 1081 (September 1954)

Vitamin E-deficient chicks were fed two percent oil from various species of fish in an α-tocopherol-low basal diet consisting of white corn meal, soybean oil meal, fish meal, casein, vitamins, and minerals. The following fish oils, with their respective iodine numbers, were tested for their influence on the incidence of encephalomalacia; menhaden, 151; commercial vitamin A and D, 140; cod liver, 130; red fish, 106; and herring, 103.

Mortality of chicks fed the oils from various sources were 85%, 72%, 70%, 15%, and 18% respectively, as compared with 2% for the basal diet. There appears to be a direct correlation between the degree of unsaturation of the fish oil as measured by iodine number and the percentage of mortality due to encephalomalacia.

Graded levels of menhaden fish oil, 0, 0.25%, 0.50%, 1.00%, and 2.00%, were compared with diets containing amounts of menhaden fish meal sufficient to contribute 1.00% or 2.00% oil to the chick rations. Results indicate: (1) that there is a marked increase in incidence of encephalomalacia when fish oil is increased from 0.50% to 1.00%, and (2) that oil present in the menhaden fish meal is just as effective in producing positive encephalomalacia as pure menhaden oil.

COMPOSITION OF NATURAL FATS

VITAMIN E IN FAT OXIDATION

MODE OF ACTION OF VITAMIN A

ENCEPHALOMALACIA IN CHICKS

4.21 (Cross Reference: 5.7)

demonstrates that the vitamin E inhibition of hematin-catalyzed oxidations can cause an in vivo "sparing action" of fatty acids, vitamin A and carotene. This "sparing action" has been demonstrated with simple systems of hemoglobin- and cytochrome c-catalyzed linoleate oxidation and the cooxidation of vitamin A and carotene in oleic acid oxidation catalyzed by hemin.

Hematin compounds occur in large concentrations in animal tissues as the predominant catalysts for linoleate oxidation. When compared with autocatalysis, the rate of linoleate oxidation catalyzed by hematin compounds is considerable, and this rate increases with increasing unsaturation of the fatty aicd. This postulated role of vitamin E must be validated by further research on unsaturated fat oxidation catalyzed by hemin compounds and its significance in vivo.

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The most notable features of land animal reserve fats are the regular presence of about 30% palmitic acid, with oleic and sometimes stearic acid, but only minor amounts of the more unsaturated C_{18} acids. Elephant fat is exceptional in that it contains 45% palmitic acid, whereas horse fat also seems exceptional in that it contains up to 16% of linolenic acid.

The characteristic features of the fats of marine animals are their large quantities of hexadecenoic acid and polyethenoid acids, which have 20 and 22 carbon atoms per molecule. The relative proportions of these acids, and of the unsaturated C_{18} acids, vary widely from one type of fish or marine mammal to another. Quantitatively, however, the mixture of fatty acids in the glycerides is the same. In one family, the toothed whales (Physeteridae), the glycerides are largely replaced by esters of long-chain aliphatic alcohols. Dolphins and porpoises (Delphinidae) violate convention by producing in their head and body oils mixed glycerides in which the usual marine fatty acids are supplemented by a major amount of isovaleric acid.

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body would resemble the mode of action in the retina. This did not prove to be true.

It has now been determined that as a state of vitamin A deficiency appears in the animal body, abnormal metabolites accumulate at various sites in the body, particularly the liver. These metabolites disappear when curative doses of vitamin A are given. It is believed that the systemic mode of action of vitamin A may be one of regulating the dehydrogenation of substrates such as sterols. The vitamin A deficiency syndrome may be due, therefore, to the accumulation of metabolites which in themselves can act as enzyme inhibitors.

6.193 FURTHER INFORMATION ON UNIDENTIFIED CHICK GROWTH FACTORS

Camp, A. A.; Cartrite, H. T.; Quisenberry, J. H.; and Couch, J. R.
Poultry Science 33, No. 5, 1047 (September 1954)

The floor-pen experiments were conducted in an effort to ascertain the value of adding several possible sources of unidentified growth factors to the diet of the chick. The basal diet was an all-vegetable protein diet containing all the known vitamins and minerals at levels known to be adequate for the chick and an antibiotic. Day-old, sexed, White Rock chicks were assorted at random, within sex, and distributed among 12 pens of a multiple unit brooder house equipped with butane brooders, automatic watering devices, and peanut hull litter. One hundred male and one hundred female chicks were placed in each pen. The ten weeks data strongly indicated that dried whey, a distillers fermentation product, and hydrolyzed whey contain an unidentified chick growth factor as growth rate was increased at a highly significant level. Furthermore, fish solubles showed an entirely different growth factor which also initiated a highly significant increase in growth rate when compared with the basal diet. When fish solubles was fed in the presence of either of the above sources of the "whey" factor, a highly significant increase in growth rate was noted when the weights were compared with the weights of the chicks receiving a source of only one of these chick growth factors. Feed efficiency was also increased when either of growth factors, or a combination of the two, was present in the diet.

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6.193 INFLUENCE OF ARSANILIC ACID ON DIETARY REQUIREMENT OF CHICKS FOR CERTAIN UNIDENTIFIED GROWTH FACTORS

Combs, G. F.; Romoser, G. L.; and Bishop, R. W. (University of Maryland, College Park)
Journal of Nutrition 53, No. 4, 511-522 (August 10, 1954)

Poultry need at least two different unidentified growth factors for rapid growth. One of these factors is supplied by various liver and fish products; the other is supplied by dried whey products, brewers' yeast, distillers' solubles, and certain fermentation products. Limited observations indicate that arsanilic acid (p-aminophenylarsonic acid), like the antibiotics, influences, to a certain extent, the microbial population within the intestinal tract of chicks and poults. Experiments were conducted, therefore, to determine if orally administered arsanilic acid would influence the dietary requirements of the chick for the unidentified growth factors in fish products and dried whey.

Two separate chick feeding experiments were conducted. Experiment 1 was continued for 8 weeks; experiment 2 was continued for 8.5 weeks. In each experiment 14 groups of sexed chicks were maintained in floor pen units on litter. Each group of chicks consisted of 100 male and 100 female New Hampshire chicks.

Three basal rations, A, B, & C, adequate in all known nutrients required by the chick, including procaine penicillin, were fed in these experiments. When the basal rations were supplemented, adjustments were made as required to maintain comparable levels of calcium, phosphorus and protein.

The addition of 5% fish meal, 2.5% dried fish solubles product (40% fish solubles and 60% crab meal), 2% condensed fish solubles, or 5% fish meal plus 2% condensed fish solubles to ration A, which contained dried whey, improved feed efficiency and the average 8-week weights. The same fish products improved feed efficiency to even a greater degree and stimulated the growth of chicks as

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 ABSTRACTER: Martin Heerdt

5.112 THE CONFUSING STORY ABOUT VITAMIN A AND ALCOHOL

Anonymous
Journal of the American Oil Chemists' Society 31, No. 8, 29 (August 1954)

In living animals the intake of ethyl alcohol causes the level of vitamin A in the blood plasma to rise, provided that there is a normal store of vitamin A in the liver to begin with. This reaction to alcohol is so unfailing that it provides a valuable means of determining if the animal body is adequately supplied with vitamin A. The inconvenience of sacrificing the animal and removing a small piece of the liver for direct assay is therefore eliminated. This is the opinion of some Wisconsin dairy scientists who have confined their studies to calves and goats.

If vitamin A esters in alcohol are stored in glass bottles they decompose very rapidly but not in the usual way; i.e., they do not become oxidized. The vitamin A esters decompose instead by splitting off all of their fatty acids. This leaves a mixture of anhydro vitamin A, vitamin A ethyl ether, and some decomposition products, but not any real vitamin A. Decomposition of vitamin A in alcohol does not occur if the starting product is free vitamin A instead of the more familiar vitamin A esters. This may not be entirely clear to people who are not vitamin chemists, because free vitamin A is vitamin A alcohol. In any formula that requires vitamin A to withstand decomposition in the presence of an alcohol -- including glycerine or glycols, which are also alcohols -- free vitamin A should be used.

 ABSTRACTER: Martin Heerdt

5.111 NEW TWIST IN VITAMIN A

Anonymous
Chemical Week 75, No. 13, 122-123 (September 25, 1954)

A new way of synthesizing vitamin A was recently unveiled by a Rochester, New York firm. Thus far this firm has used their new technique to make five different geometric isomers of vitamin A. These 5 isomers include: trans-vitamin A acetate (the commercial form and international standard), neo-vitamin A (the 2-cis isomer which is also found in fish liver oils), the 6-cis isomer, the 2-6-di-cis isomer, and the 2,4-di-cis isomer. Biological assay has indicated that trans-vitamin A has 25% more activity than neo-vitamin A and 500% more activity than any of the 3 new isomers.

There is reason to believe that uses will eventually be found for the new isomers. Studies at the University of Rochester Medical School have already revealed that victims of celiac disease (inability to assimilate fats) require vitamin A in the form of vitamin A alcohol or aldehyde rather than in the form of vitamin A.

The new method of synthesis is unique in its ability to form single, unmixed, stereoisomers of vitamin A without the need for costly separation steps. The new method also presents a novel way of adding 4 carbons to any carbon chain. The key to the reaction is methyl β-methylglutaconate which, when condensed with β-ionylideneacetaldehyde, produces 4-carboxy-vitamin A acid. This acid is then decarboxylated and the ester of this product is reduced to vitamin A alcohol with lithium aluminum hydride.

This method of synthesis still depends on a link with the past; i.e., the use of β-ionone as a starting material. Ionone is derived from citral which in turn comes from lemon grass oil -- the raw

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 ABSTRACTER: Martin Heerdt

CHICK GROWTH FACTORS

VITAMIN A ALCOHOL

ARSANILIC ACID IN CHICK DIETS

SYNTHESIS OF VITAMIN A

5.112 (Cross Reference: 5.111)

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material that is used to make most synthetic vitamin A. If synthetic citral becomes a reality, the new synthesis will no longer be dependent upon lemon grass oil. It has been rumored that an Eastern chemical manufacturer already has a workable synthesis for citral.

Trans-vitamin A aldehyde and its 2-cis isomer have equal biological activity or about 90% of the activity of trans-vitamin A acetate. Trans-vitamin A aldehydes with 6-cis and 2, 6-di-cis bonds have only 20% of the activity of trans-vitamin A acetate. The 2, 4-di-cis-aldehyde (also named neoretinene b), however, is 50% as active as trans-vitamin A acetate. Neoretinene b has been identified as a component of the light-sensitive pigment of the human eye.

The new isomers of vitamin A were characterized by their ultraviolet absorption, their infrared spectra, their physical properties and their chemical properties (e. g., their reaction with maleic anhydride).

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well when arsanilic acid was added to ration A. The addition of arsanilic acid at levels of 90 or 120 p. p. m. to unsupplemented ration A did not improve feed efficiency or the growth rate of chicks.

When 2. 5% dried whey was added to ration C, which contained no whey, or to ration C modified to contain 2% fish solubles, the improvement in the growth rate of chicks was not significant. The addition of dried whey to these rations in the presence of 90 p. p. m. of arsanilic acid, however, resulted in a highly significant growth response. When arsanilic acid was added to rations that did not contain whey there was no improvement in the growth rate. Significant growth responses were obtained when either 2. 5% dried whey, 2% condensed fish solubles, or both, was added to the presence of 90 p. p. m. arsanilic acid.

The data in table 5 shows the effect of arsanilic acid and condensed fish solubles as obtained in both experiments. The combined data confirmed the observations made in experiment 1, namely, that the addition of arsanilic acid increased the chick requirement for the unidentified factor present in fish solubles. A growth response was not obtained in the absence of arsanilic acid from the addition of 2% condensed fish solubles. Conversely, highly significant growth responses were obtained from the addition of 2% fish solubles in the presence of arsanilic acid.

TABLE 5

Response of chicks to condensed fish solubles and arsanilic acid as supplements, alone and in combination

SUPPLEMENT	RATION A SERIES (EXP. 1)	RATION B SERIES (EXP. 2)	RATION C SERIES (EXP. 2)	AV. OF THREE SERIES	AV. CHANGE DUE TO TREATMENT
			Av. weight, both sexes,[1] gm		
None	942	1153	1100	1065	
90 p.p.m. arsanilic acid	928	1061	1082	1024[2]	−41
2% condensed fish solubles	977	1170	1132	1093	+28
2% cond. fish sol. + 90 p.p.m. arsanilic acid	1042	1202	1149	1131[3]	+66
			Feed required/unit gain		
None	2.66	2.58	2.64	2.63	
90 p.p.m. arsanilic acid	2.72	2.68	2.68	2.69	+.06
2% condensed fish solubles	2.45	2.54	2.68	2.56	−.07
2% cond. fish sol. + 90 p.p.m. arsanilic acid	2.38	2.59	2.59	2.52	−.11

[1] For experiment 1, averages based on 8-week individual weights of 20 males and 20 females per treatment; for experiment 2, averages based on 8.5-week individual weights of 22 males and 22 females per treatment.

[2] The difference between this value and the corresponding value obtained for the unsupplemented groups is statistically significant to the 5% level.

[3] The difference between this value and the corresponding value obtained for the unsupplemented groups is statistically significant to the 1% level.

6.3

THE CAROTENE, CAROTENOID AND CHLOROPHYLL CONTENTS OF SOME SCOTTISH SEAWEEDS

Owen, E. C. (Hannah Dairy Research Institute, Kirkhill, Ayr)
Journal of the Science of Food and Agriculture 5, No. 9, 449-453 (September 1954)

Some species of brown, green and red seaweeds collected in southeast Scotland have been analyzed for carotene, total xanthophylls (other than fucoxanthin) and total chlorophyll. A land plant, the common dockweed, was analyzed for comparison. Carotenoids were extracted from the saponified samples with ethanol and light petroleum, and estimated by absorptiometry in a Unicam spectrophotometer. Carotene was isolated from xanthophylls by chromatography on alumina and determined separately. Total chlorophyll was measured similarly, at the point of maximal absorption in the red region of the spectrum, in a methanol extract of the plant material. The results appear in table 1 (omitted) and table 2 (this card, over). In the brown algae, carotene was found to be usually more abundant than xanthophylls. The red and green algae resembled land plants in having less carotene than xanthophylls. Ratios of xanthophylls to carotene and of total chlorophyll to total carotenoids in brown, green and red algae were similar to ratios calculated from the data of Seybold & Egle, though the concentrations of both green pigments and carotenoids were less in the present samples than in species of the same name examined by Seybold & Egle. It is concluded that, like land plants, marine algae contain amounts of carotenoids that are related much more nearly to the amount of chlorophyll than to the major constituents of the plant's dry matter.

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DRYING EXPERIMENTS 1953. IV. DRYING CONDITIONS AND QUALITY OF MEAL

Sand, G.; Boge, G.; Johannessen, B.; and Laksesvela, B.
Meldinger fra SSF, No. 5, 79-89 (August 1954)

The authors determined the protein quality and the riboflavin, pantothenic acid, niacin, and vitamin B_{12} content of ordinary herring meals and whole herring meals. The ordinary meals were dried at inlet temperatures ranging from 200 to 600° C., for time intervals ranging from as long as 45 minutes to as short as 7 minutes, and at capacities ranging from 100 to 600 kilograms per hour. The whole meals were dried at inlet temperatures ranging from 200 to 600° C., for time intervals ranging from as long as 45 minutes to as short as 15 minutes, and at capacities ranging from 140 to 300 kilograms per hour.

Microbiological determinations for riboflavin, pantothenic acid, niacin and vitamin B_{12} (tables 5-8 omitted) showed no significant destruction of these vitamins under any of the drying conditions used. A decrease in vitamin B_{12} did occur in some cases, but this decrease can not be related to any definite technical factor. Higher values were found for pantothenic acid in the meal than in the presscake; however, this is an analytical perculiarity that is often encountered in the authors' laboratory.

Chick feeding tests (with riboflavin as a controlling factor) showed no loss of riboflavin in any of the various meals. Chick feeding tests for protein quality did not show any significant difference among the meals dried to a normal moisture content. However, one of the meals that had been dried to an exceptionally low moisture content was appreciably lower in protein quality.

 ABSTRACTER: Martin Heerdt

6.193

AN UNIDENTIFIED CHICK GROWTH FACTOR IN HERRING MEAL

Laksesvela, Birger
Meldinger fra SSF, No. 5, 94-102 (October 1954)

Herring whole meal and herring solubles significantly improved the growth of chicks on a ration composed of a variety of cereals, oil meals, minerals, vitamins, vitamin B_{12}, and procaine penicillin. The herring whole meal and the herring solubles were incorporated in this ration at the 7% level. Different levels of protein were obtained in the rations by varying the cereals used. Methionine was maintained at desired levels in the rations by supplementation.

The chick-growth-promoting properties of herring whole meal, and herring solubles in the rations were not influenced appreciably by the protein level of the ration. Similarly, the chick-growth-promoting properties of methionine in the rations were not influenced by raising the level from just below standard up to standard. Supplemental DL-methionine was effective for promoting growth with rations having a low protein level, but it did not produce maximal growth if used in conjunction with all-vegetable rations.

The authors attribute the growth promoting effect of herring products to an unidentified growth factor that was more effective and more uniform in action than crystalline vitamin B_{12}.

Procaine penicillin was effective in producing chick growth in addition to that produced by the presence of herring products (the unidentified factor) in the ration.

 ABSTRACTER: Martin Heerdt

6.14

BAGS FOR HERRING MEAL

Sparre, T. and Arnesen, Erling (Herring Oil and Herring Meal Industry Research Institute, Bergen, Norway)
Meldinger fra SSF, No. 5, 103-108 (October 1954)

A number of new types of bags filled with whole herring meal were tested for strength toward rough handling and permeability to moisture in the air. Moisture permeability of the bags was measured by the increase in the weight of the meal that occurred during storage, whereas the strength of the bags was measured by repeated dropping from shoulder height.

The bag that was strongest and most impermeable to moisture was made from 5-layers of unglazed kraft paper and one layer of crepe/asphalt. A similar bag made with two layers of crepe/asphalt instead of one offered very little additional protection against moisture and reduced the strength of the bag considerably. By comparison, a 6-layer kraft bag without crepe/asphalt was stronger than the 5-layer bag but too permeable to moisture.

Bags made from 5 layers of kraft paper and one layer of polyethylene film also showed good impermeability, but improvement was needed in the method used to glue the seams together. Jute bags impregnated with various materials were used in comparison tests with the paper bags.

The permeability of the various bags to 65% relative humidity air moving at a speed of 3 meters per second was determined by direct measurements. These measurements confirmed the practical findings.

 ABSTRACTER: Martin Heerdt

Table II

Carotene, carotenoids and 'total chlorophyll' in marine algae; all samples were analysed after having been dried and milled to a fine powder; the dockweed (Rumex *sp.*) *was analysed fresh*

Species	Place and date of harvest	Carotenoids, mg./100 g. of dried material			Ratio (y/x)		'Chlorophyll' (l)		Ratio (l/k)		Notes
		Total (k)	Carotene (x)	Non-carotene carotenoids (y)	Present results	Seybold & Egle	Wavelength of max. absorption mμ	Chlorophylls mg./100 g. of dry matter	Present results	Seybold & Egle	
*Rumex sp.** (dockweed)	Kirkhill Farm, Ayr, 21.12.53	84·3	28·9	55·4	1·92	2·3†	675	302	3·6	—	
Enteromorpha intestinalis	North Berwick, 3.3.53	39·9	9·8	30·1	3·07	5·5–7·4	672·5	127	3·2	3·7	Seybold and Egle analysed *E. linza* and *E. compressa* but not *E. intestinalis*
Cladophora rupestris	North Berwick, 3.3.53	19·6	0·8	18·8	23·50	5·3	672·5	270	13·8	4·95	
Fucus vesiculosus	North Berwick, 3.9.52	10·7	5·8	4·9	0·85	1·0	677·5	98·8	9·2	14·0	
Pelvetia canaliculata	North Berwick, 3.9.52	9·7	3·8	5·9	1·55	—	677·5	60·0	6·2	—	Not analysed by Seybold & Egle
Laminaria cloustoni (frond)	Dunbar, 16.9.52	1·9	1·4	0·5	0·36	0·52	677·5	21·6	38·0	17·8	
L. cloustoni (stipe)	Dunbar, 16.9.52	0·05	0·01	0·04	4·00	—	677·5	4·6	9·2	—	Not analysed by Seybold & Egle
L. digitata (frond)	North Berwick, 3.3.53	1·6	1·0	0·6	0·60	0·41	675	43·2	27·0	21·3	
L. digitata (stipe)	North Berwick, 3.3.53	0·35	0·14	0·21	1·67	—	675	5·9	16·8	—	Not analysed by Seybold & Egle
Ascophyllum nodosum	North Berwick, 3.9.52	3·0	2·5	0·55	0·22	0·85	677·5	32·0	10·7	8·8–11	
Gigartina stellata	North Berwick, 3.3.53	5·1	0·4	4·7	11·81	1·8 to 16·3	675	34·5	6·8	1·8–4·6	Seybold & Egle extreme values for 18 spp. of Rhodophyceae which did not include *G. stellata* or *R. palmata*
Rhodymenia palmata	North Berwick, 3.9.52	34·1	11·5	22·6	1·97		675	63·0	1·8		

* Land plant for comparison.

† Ratio (y/x) for *Rumex obtusifolia* analysed by Moon[14a] but not by Seybold and Egle.[14]

3.61 EFFICIENT LABORATORY FREEZE-DRYING APPARATUS

Tappel, A. L. (University of California, Davis, California)
Analytical Chemistry 26, No. 10, 1671-1672 (October 1954)

The author has designed a freeze-dryer that will accommodate irregular solids and satisfy theoretical requirements with a condenser temperature below -40° C. It has a short and unrestricted vapor bath between the sample and the condenser, a low total pressure, and a rapid heat input into the sample to provide heat for vaporization of ice at the maximum rate.

The apparatus is shown in figure 1 (this card, over) as it appears during operation. A, is an insulated stainless steel condenser or hollow annular chamber 18 inches in diameter and 2 inches high with a 2-inch stainless steel pipe center well, B. The top of the condenser is machined flat so as to form a seal with the bottom of a bell jar which serves as the freeze-drying vacuum chamber and permits both a view of the sample and an opportunity to heat the sample from the outside with infrared lamps. Bell jars of various sizes may be used. The prefrozen sample, if a solid, is supported about 2 inches above the condenser on a wire gauze, whereas frozen liquids are dried in pans, beakers or wide-mouthed bottles.

In operation, the condenser is maintained at -60° C. or below with ethyl alcohol, which is circulated by means of 5/16-inch copper tubing through a dry ice-acetone pack and then through the inside of the stainless steel condenser.

A vacuum of 0.3 mm. or less is maintained by an electric motor-driven pump, P that has a free air capacity of 33.4 liters per minute. Sample temperatures may be measured during freeze-drying by the use of 6 copper-constantan thermocouples which enter the center well through a wax seal. Removal of the samples for weighing and subsequent replacement during the course of freeze-drying has been facilitated by the use of a neoprene gasket, V, 1/4-inch thick, between the condenser surface and the bottom of the bell jar. Continuous weighing during freeze-drying can be accomplished by suspending the sample from a calibrated spring attached to the top of the bell jar. A 1-inch beefsteak may be freeze-dried to 10% moisture in approximately 24 hours with this apparatus.

(over)

 ABSTRACTER: Martin Heerdt

3.12 ANTIBIOTICS AS AIDS IN FISH PRESERVATION. I. STUDIES ON FISH FILLETS AND SHRIMP

Farber, Lionel
Food Technology 8, No. 11, 503-505 (November 1954)

The author studied the effects of chlorotetracycline, hydroxytetracycline, neomycin and a commercial mixture of fumaric acid and sodium benzoate on the keeping quality of lingcod fillets, black-cod fillets, sole fillets, and raw whole shrimp at temperatures above 0° C. The fillets and shrimp were dipped for 1 or 2 minutes in different solutions each of which contained 5% NaCl and one of the following: 2 p. p. m. chlorotetracycline, 2 p. p. m. neomycin, 2 p. p. m. hydroxytetracycline, or 1000 p. p. m. of the commercial mixture. Control lots of fillets and shrimp were dipped for 1 or 2 minutes in 5% NaCl solution only.

After being immersed in one of the solutions the fillets and the shrimp were drained and then wrapped in parchment for storage. The lingcod and black-cod fillets were stored in a container surrounded by a mixture of salt and ice. The sole fillets and the shrimp were stored at 45° F. in a household refrigerator. To evaluate the effect of the preservatives, press juice was obtained at approximately daily intervals from the fillets or shrimp and centrifuged to yield a clear aqueous portion that was free from oil. Five ml. of press juice was used for each determination of volatile reducing substances according to the method of Lang, Farber, Beck and Yerman (1944), whereas 1 ml. of press juice was used to carry out each total volatile nitrogen determination and each trimethylamine nitrogen determination, both according to the micro-diffusion technique of Conway.

Chlorotetracycline and hydroxytetracycline had a definite preservative effect on fish fillets in the order named, but no effect on the shrimp at the concentration used (tables 1, 2, 3, & 4, this card, over). Neomycin was not effective for prolonging the storage period of either the fish fillets or the shrimp. The mixture of fumaric acid and sodium benzoate had some preservative effect for fish fillets but not for the shrimp. However, this mixture was less effective than either of the above tetracycline derivatives.

(over)

 ABSTRACTER: Martin Heerdt

3.249 THE TECHNIQUE OF COLD STORAGE OF FISH AND OTHER EDIBLE MARINE ANIMALS

Dieuzeide, R. and Novella, M.
Rev. gen. Froid 28, 367-80, 471-83, 585-97 (1951)
Food Science Abstracts 26, No. 5, 509 (September 1954)

The histological, physical, and chemical changes which occur during the cold storage and freezing of fish are discussed. Refrigeration suitable for short term storage is considered. The limitations of freezing are outlined, and the chief freezing processes used (freezing by air-blast, direct immersion or sprinkling methods, and indirect methods) are analysed. Examples are given of the cold storage of fish, the use of brine vats being recommended, and of frozen fish, with reference to the use of glazing. The importance of careful thawing is emphasized. The freezing of fish fillets is analysed, and an Icelandic freezing plant is described.

THE DRYING OF FISH IN COLD STORE

Banks, A.
Proc. Inst. Refrig., London, 1951, 48, 109-111 (1953)

Frozen fish in cold store has been observed to lose weight at an annual rate of about 30% at 14° F. (-10° C.), 12% at -4° F. (-20° C.), and 3% at -22° F. (-30° C). Loss of weight is accompanied by loss of quality (freezer burn, and accelerated rancidity in fatty fish). The primary factor causing drying is leakage of heat into the cold store, due to imperfect insulation, placing in storage fish at a temperature above that of the store, opening of doors, etc. Such leakages should be prevented as far as possible.

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3.33 HEADSPACE GAS COMPOSITION

Kefford, J. F. and Davis, E. G.
Food Preservation Quarterly 14, No. 3, 46-52 (September 1954)

The composition of headspace gas in normal canned foods differs from air in that most of the oxygen disappears, the percentage of nitrogen increases and carbon dioxide appears. The cause of spoilage in canned foods is frequently detected by determining the variation of headspace gas composition from that of normal packs.

Shortly after a can is sealed, oxygen disappears due to corrosion reactions with the internal tinplate surface or absorption by the food product. Carbon dioxide is formed by such reactions as the browning reaction. Incipient microbial decomposition in fish prior to canning causes a high carbon dioxide content in the canned product.

Swelled cans are caused by excessive production of carbon dioxide or hydrogen. The hydrogen is usually produced by electrochemical reactions between the food and the can after the oxygen has disappeared. Occasionally, hydrogen is formed by microbial spoilage. Factors that can cause hydrogen swells are long storage periods, light tinplate, and low initial vacuums.

Swells have been found in cans containing cured meats in which nitrites have been added. The nitrites form nitrogen and oxides of nitrogen in the canned product.

An apparatus for analyzing headspace gas is explained in some detail.

The author includes 33 current references.

 ABSTRACTER: G. M. Pigott

FREEZE-DRYING APPARATUS

COLD STORAGE OF FISH

ANTIBIOTICS AS FISH PRESERVATIVES

HEADSPACE GAS COMPOSITION

3.61 (Cross Reference: 0.113)

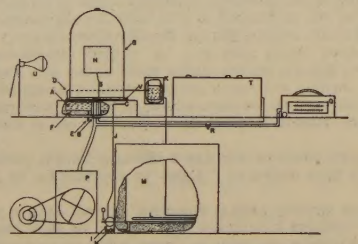

Figure 1. Assembled Apparatus

The stainless steel condenser, *A*, consists of a hollow annular chamber 18 inches in diameter and 2 inches high, with a 2-inch stainless steel pipe center well, *B*. The condenser is fabricated from stainless steel sheet and is of an all-welded construction except for the copper tubing heat transfer fluid inlet, *C*, outlet, *D*, and drain, *E*, which are silver-soldered in place. The top of the stainless steel condenser is machined flat, so that vacuum bell jars form a good vacuum seal. The stainless steel condenser is surrounded on the bottom and side by 2 inches of glass wool insulation, *F*, which is held in place by a sheet metal container. The insulation is sealed with an asphalt paint to prevent entrance

3.12

TABLE 2

Storage of black cod (sablefish) fillets at 2.8° C. (37° F.) after a minute dip in 5% brine and in 5% brine containing 2 p.p.m. of chlorotetracycline, neomycin, hydroxytetracycline and 1000 p.p.m. of fran-kem

Days stored [1]	Brine			Brine and chlorotetracycline			Brine and neomycin			Brine and hydroxytetracycline			Brine and fran-kem		
	VRS	TVN	TMN	VRS	TVN	TMN	VRS	TVN	TMN	VRS	TVN	TMN	VRS	TVN	TMN
0	11.2	5.8	0	11.2	5.8	0	11.2	5.8	0	11.2	5.8	0	11.2	5.8	0
1.0	8.4	5.0	0	7.6	3.1	0	14.8	3.1	0	12.9	2.8	0	15.7	2.2	0
2.1	6.9	4.3	0	9.6	2.5	0	7.9	3.7	0	9.1	2.5	0	9.8	3.1	0
4.04	7.4	4.3	0.2	7.6	1.5	0	7.4	4.6	0.1	6.7	4.0	0	10.6	3.7	0
6.13	29.0	27.7	24.6	9.9	6.8	1.9	23.1	26.5	21.0	10.0	3.7	0.3	11.4	5.6	0.2
6.95	39.0	16.4	13.0	6.8	6.2	0.3	19.8	18.5	14.7	9.8	8.3	5.0	12.4	15.4	0.4
7.95	20.7	5.9	4.3	9.7	6.2	1.2	31.0	38.0	19.8	8.8	5.0	3.7	22.6	8.7	6.8
9.13	....	....	....	15.5	14.2	8.4	32.0	32.0	11.7	30.8	26.0	12.4	30.0	11.1	7.4

[1] The brine—, neomycin—, hydroxytetracycline—, and fran-kem-treated fillets were judged definitely spoiled after storage for 6.13, 6.13, 9.13 and 7.95 days, respectively. The chlorotetracycline-treated ones were judged still passable after 9.13 days.

TABLE 1

Storage of Lingcod fillets at 9.4° C. (48.9° F.) after a minute dip in 5% brine and in 5% brines containing 2 p.p.m. of Chlorotetracycline and Neomycin

Days stored	Brine			Brine and chlorotetracycline			Brine and neomycin		
	VRS [1]	TVN [2]	TMN [3]	VRS	TVN	TMN	VRS	TVN	TMN
0	10.0	7.4	0	10.0	6.8	0	10.0	8.0	0
0.79	11.4	10.5	0	9.6	6.8	0	10.0	8.6	0
2.0	9.6	11.1	2.5	7.9	8.0	0	13.6	8.6	0.2
2.77	20.0	20.9	15.1	8.8	12.0	0.3	27.0	27.7	16.0
3.15	28.1	49.5	35.8	11.5	15.8	1.2	36.3	49.5	31.1
3.79	31.0	29.5	24.0	34.4	19.1	6.2	34.8	19.5	24.0
4.88	28.5	25.4	18.5	25.4	25.3	35.0	61.0	22.0	

[1] Volatile reducing substances as microequivalents reduction per 5 ml. of press juice.
[2] Total volatile nitrogen as mg. per 100 ml. of press juice.
[3] Trimethylamine nitrogen as mg. per 100 ml. of press juice.
The fillets were judged spoiled after storage at 2.77, 3.79 and 2.77 days respectively.

TABLE 3

Storage of sole fillets at 7.2° C. (45° F.) after a minute dip in 5% brine containing 0.1% Tween 21 with and without 2 p.p.m. of Chlorotetracycline

Days stored [1]	Brine			Brine and chlorotetracycline		
	VRS	TVN	TMN	VRS	TVN	TMN
0	10.4	0	0	8.4	0	0
2.04	10.4	0	0	10.1	0	0
3.0	7.4	0	0	....	0	....
6.0	14.2	4.6	1.2	8.8	1.2	0
7.0	17.9	29.5	8.6	6.6	0	0
8.0	....	....	....	10.8	6.2	2.8
10.0	....	....	....	9.3	4.6	2.8

[1] The fillets dipped in brine were spoiled after 7 days, whereas those dipped in chlorotetracycline were judged still passable after 10 days.

TABLE 4

Storage of raw whole shrimp at 7.6° C. (45.6° F.) after a two-minute dip in 5% brine and in 5% brines containing 2 p.p.m. of Chlorotetracycline and 1000 p.p.m. of Fran-Kem

Days stored [1]	Brine			Brine and chlorotetracycline			Brine and fran-kem		
	VRS	TVN	TMN	VRS	TVN	TMN	VRS	TVN	TMN
0	6.1	0	0	6.1	0	0	6.1	0	0
1.08	7.8	0.3	0	8.7	2.5	0	11.3	0	0
3.0	7.9	0.3	0	5.7	0.5	0	11.3	0.5	0
5.16	16.4	4.9	0	11.3	6.1	0	17.3	5.9	0
6.0	18.5	5.9	0	11.3	6.2	1.5	21.4	4.1	0
7.0	26.6	8.7	0.9	30.9	12.0	1.8	21.4	3.7	0.2
8.1	31.0	16.6	2.2	29.2	14.2	1.9	27.0	12.9	3.7
9.0	17.0	7.4	0.3	23.0	10.8	2.5	24.0	13.6	1.5

[1] All the samples were judged spoiled after storage for 7 days.

2.08 PRODUCES DRY, LOW-TEMP FLAKE ICE WHICH REMAINS FREE-FLOWING

Gordon, Charles D. (Booth Fisheries Canadian Co., Ltd., Petit de Grat, Nova Scotia)
Food Processing 15, No. 11, 20-22 (November 1954)

Flake-ice at 10° F. is now being produced continuously by two machines installed in a plant at Petit de Grat, Nova Scotia. Each machine is capable of delivering 14 to 18 tons of flaked ice in 24 hours.

The machines consist of a vertical series of blades which shear ice from the sides of a cylinder wall as they revolve around it without actually touching it. At the point of ice removal the cylinder wall is dry. The ice becomes sub-cooled and shrinks away from the cylinder wall, facilitating the shearing action of the blades. Directly as the blades have passed, cooled water is distributed down the cylinder wall in a wide curtain. Ice temperature can easily be adjusted by varying the width of the arc covered by the water distributor. The narrower the curtain pattern, the longer the water sub-cools before the blades again complete the removal cycle. Ice flakes as low as 0° F. in temperature can thus be discharged. Excess water is caught in a water-receiving ring located below the cylinder. Water used in the ice-making process is also supplied from this lower ring, where it is precooled by the water from the cylinder.

The only moving parts of the machine are the central drive shaft and drive unit. Because the cylinder -- which contains the refrigerant -- remains stationary, no rotating seals are needed, either for the refrigerant or for the water. Maintenance of the units is extremely low because of the simplicity of their design, and for the same reason, the likelihood of mechanical breakdown is remote.

To prevent heat losses, each unit is operated within an eight-inch cork insulated jacket.

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 ABSTRACTER: Roy C. Stevens

3.230 CANNED, FROZEN, OYSTER STEW

Anonymous
Fishing Gazette 71, No. 11, 38 (November 1954)

A new product, canned, frozen oyster stew, has recently been introduced by a Delaware company. The product has been test-marketed and has achieved excellent acceptance.

The stew contains no flour or base, only spices, whole milk, butter, oysters, and oyster nectar. It is so formulated that the milk added at the plant, or the equal quantity added in the consumer's kitchen will never curdle. According to the company's principals, the secrets of the product's unique mild and delicate flavor are the special techniques employed, the flash-freezing process, and the choice of the most perfect and tender oysters from the company's own farm acreage.

Simple instructions on the can make it possible to serve the oyster stew at any time by merely adding an equal amount of milk to the can and heating.

 ABSTRACTER: Roy C. Stevens

2.114 REFRIGERATING PLANTS ON FISHING VESSELS

Hondorf, G.
Kaltetech 3, 316-17 (1951)
Food Science Abstracts 26, No. 5, 508 (September 1954)

On fishing vessels, mechanical refrigeration does not eliminate the use of ice, but it enables the ice to be better utilized. Under normal summer conditions in the North Sea or North Atlantic (with an air temperature of 22° to 25° C., and a sea-water temperature of 16° C.), the requirements of the refrigerating machine are estimated to be 1.7 B. Th. U. per cu. ft. per hour for a hold of 350 to 400 cu. m capacity. Some of the new fishing vessels built in Germany are equipped with one- or two-cylinder, direct current Freon compressors, which are reported to have given excellent service. Various aspects of construction and design are discussed.

A NEW KIND OF OLEOHYDRAULIC REFRIGERATING MACHINE FOR TRAWLERS

Rothe, W. and Klotz, W.
Kaltetech 4, 60-62 (1952)
Food Science Abstracts 26, No. 5, 508 (September 1954)

A new refrigerating machine, specially designed for use on trawlers, in which carbon dioxide is used as refrigerant, is described. The machine has an alternating two-piston type of compressor, with the pistons at each end of the same axis, the middle portion of which forms an auxiliary piston receiving an alternating impulse through an oil circuit. Admission of this oil on both sides of this piston is regulated by a slide-valve. A hermetic unit is thus obtained, with good mechanical efficiency.

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2.3 SPLIT FILLETS

Sanford, F. Bruce (U. S. Fish and Wildlife Service, Seattle, Washington)
Fishing Gazette 71, No. 10, 40-41 (October 1954)

Split fillets are those formed by cutting whole fillets horizontally into halves. With rockfish and other species yielding thick fillets, these split fillets have a number of advantages as compared with whole ones. For example, split fillets -- because of their thinness -- not only cook easier but actually taste better.

Details of experiments on split fillets at the U. S. Fish and Wildlife Service laboratories are as follows: Whole rockfish fillets were passed through a commercial skinning machine to remove the skin from each fillet. The machine was then set to its maximum depth, which was about a quarter inch, and the fillets were passed through it a second time. Each fillet was thus split into two thinner fillets. The one from the skin side of the fish, called the surface cut, was 1/4 inch in thickness. The other, called the deep cut, varied from 3/8 to 3/4 inch in thickness. The surface-cut fillet contained the dark flesh and coloration, whereas the deep-cut fillet contained little or no coloration and therefore had a much lighter appearance. The machine did a good job, and each fillet came out intact with no ragged edges or other blemishes.

The fillets were later fried and served to a panel of 13 tasters accustomed to testing fish. The panel reported that the surface-cut fillets had a stronger flavor than did the deep-cut fillets; however, a number of the tasters liked both cuts equally well. Of the tasters who expressed a preference, those who liked the surface cut better were about equal in number to those who liked the deep cut. Everyone, including those who had no special preferences, agreed that the difference in taste between the two cuts was distinct. The panel also agreed that the appearance of the deep-cut fillet was preferable to that of

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 ABSTRACTER: F. Bruce Sanford

2.3 (Cross Reference: 3.230)

the surface-cut fillet, largely because the latter had developed a pronounced darkening on being fried.

In a comparison of split fillets with the regular ones, the tasters markedly preferred the split fillets. Their preference was due to the fact that the split fillets had a greater ratio of crisp, fried exterior to soft interior than the regular fillets had. Another advantage was that they remained crisp longer.

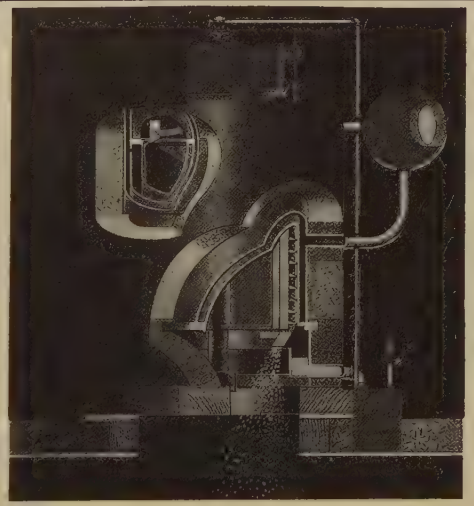
A number of tests were run in which the storage life of the deep-cut fillet was compared to that of the regular fillet. It developed that, depending on the species of rockfish tested, the deep-cut fillet had a frozen-storage life of from two to four times that of the regular fillet.

This seemed satisfactory except for one thing -- what could be done with the surface-cut fillet? Apparently the best practice would be to sell it on the fresh market, since the surface-cut fillet, being thinner and tastier than the whole fillet, should find a more ready sale. If need be, the surface-cut fillet could be held in storage for about three months. The storage life of the deep-cut fillets would probably be at least six months, the period being limited mainly by loss in texture. If no adverse texture changes take place, a storage life of up to one year could be anticipated.

Although the procedure reported here was used with rockfish, it could undoubtedly be used with other species as well. Also, the particular technique employed in this work is not necessarily the only one that could be applied to fishery products. For example, fillets might be split to uniform thickness and then cut to individual serving size. As a second example, the fillets might be split extremely thin for subsequent processing into a product similar to potato chips.

Further information on the experimental work described here is given in Fishery Separate Number 233 (Storage Life of Whole and Split Rockfish Fillets). This separate can be obtained without charge from the Director, Fish and Wildlife Service, Washington 25, D. C.

2.08



Cut-a-way view of vertical ice maker. Toward center, scraper blades shear off newly formed ice. This ice drops through center of drum to hopper below. Excess water (from portion of drum other than where ice has formed) drains into water receiving ring below inside edge of drum. Exterior is cork jacketed around ammonia or Freon jacketed cooling chamber

9.7 BRITISH "COLLEGE FOR FISHERMEN" PROPOSED

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report No. 232, Seattle, Washington, December 1, 1954

To encourage recruiting to the fishing industry, a new scheme for a "College for Fishermen" has been proposed by councillors for Waveney Ward, according to the October 15 issue of the Fishing News, a British fishing magazine.

One councillor has drawn up a draft scheme for a "Ness Point College for Fishermen," and has had discussions with representatives of the fishing industry, and with a Member of Parliament who is to discuss with those interested how to put the proposals into practice.

"There is no other trade handling such a vast amount of modern machinery involving huge capital outlay which has not some collective scheme for training its employees," says the councillor in a foreward to his draft scheme.

Many lads inclined to take up fishing for a living have been "frightened and disheartened" after one or two trips to sea, he says. "The solution is obviously a more gradual introduction to the conditions, which must be arduous no matter how modern a ship may be."

He suggests that a college be built "for this and other purposes" at Lowestoft. It would contain a complete trawler and drifter ashore with all essential working parts reproduced as near as possible under working conditions at sea. There would be an engine room with modern diesel engine, auxiliary engines, and other paraphernalia pertaining to fishing vessels, a bridge reproduced to scale with a

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9.15 TARAHUMARA INDIAN PISCICIDE: GILIA MACOMBII TORREY

Gajdusek, D. Carleton (University of Maryland, College Park, presently at Institut Pasteur de l'Iran, Teheran)
Science 120, No. 3115, 436 (September 10, 1954)

To pursue medical and ethnologic studies the author visited the Tarahumara Indians in the Sierra Madre Occidentalis of northwestern Mexico. Inquiries about the use of fish poisons were made among a small number of semi-nomadic, part-time cave-dwelling Indian families living near the Rio Conchos and other large rivers of the Sierra Madre. One of the fish poisons reported to have been used by the Indians came from Gilia macombii. This plant has not previously been reported of value as a fish poison or to be pharmacologically active in fish or mammals.

The fish poisons previously reported from this part of the Sierra Madre are the leaves of Agave sp., the bark of "Palo de la flecha", the entire plant of Calcalia decomposita A. Gray, the entire plant of Casimiroa edulis Llav. and Lex., the entire plant of Casimiroa sapota Oerst, the root of Tephrosia talpa Wats, (sometimes called Cracca talpa Wats), the sap of Sebastiania bilocularis S. Wats, and Polygonum sp.

From the Indians in the Sisoguichi and Norogachi areas the expedition was able to learn of several fish poisons still in use and was able to collect one poison called nawe and another called mateshuwa. Mateshuwa was found in bloom on the low land along streams in the area between Sisoguichi and Norogachi in September 1953. Nawe, a fish poison of the genus Tephrosia was found in the Wichaiochi area. Only the root of nawe is used as a fish poison.

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 ABSTRACTER: Martin Heerdt

0.33 "BROWNING" REACTIONS IN FREEZE-DRIED EXTRACTIVES FROM THE SKELETAL MUSCLE OF CODLING (GADUS CALLARIAS)

Jones, N. R. (Torry Research Station, Aberdeen, Scotland)
Nature 174, No. 4430, 605-606 (September 25, 1954)

This study is concerned with the browning of codling muscle extractives under mild conditions such as are encountered during vacuum contact-plate drying of fillets, dry salting, and storage of dehydrated codling muscle.

Codling muscle at 15° C. and one hour after death was repeatedly extracted with cold 75% by volume ethanol and then filtered. Chloroform was added to the ethanol extract until a 75% volume for volume mixture resulted. This mixture formed an emulsion which was shaken for 10 minutes, and then allowed to separate into two layers. The upper or aqueous layer which separated out was freeze-dried, and the resulting extractive in 1.9% yield was found to contain more than 90% of the free amino acids and 70% of the muscle-reducing substances. This extractive, a white deliquescent powder, was ground at -30° C. and stored over phosphorus pentoxide under high vacuum at 0° C. The powder contained 13.72% nitrogen and had a glucose equivalent reducing activity of 1.6%. Chromatography failed to detect free ribose; however, traces of glucose, glucosamine, and another compound, probably galactose were found. Most of the reducing substances remained to be identified.

To determine the effect of moisture content on browning, tubes containing 20 mg. of freeze-dried extractive were equilibrated in bottles of different relative humidities over a complete range as afforded by phosphorus pentoxide, sulphuric acid-water mixtures, and water. The extractives in these tubes turned first pink and then brown in color, changes that were strictly analogous to those found in intact fillets dried during storage. Figure 1 (this card, over) shows the typical effects of

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 ABSTRACTER: Martin Heerdt

9.4 PACIFIC SALMON RESEARCH EMERGES ON AN OCEANIC SCALE

Anonymous
Pacific Fisherman 52, No. 13, 9-14 (December 1954)

The newly formed International North Pacific Fisheries Commission met in Vancouver, B. C. late in October to organize a program of biological research to be conducted on the international waters of the North Pacific. Composed of members from the three signatory nations, the United States, Canada, and Japan, the commission is charged:

"As expeditiously as practicable, investigate the waters of the convention area to determine if there are areas in which salmon originating in the rivers of Canada and of the United States intermingle with salmon originating in the waters of Asia. If such areas are found the commission shall conduct suitable studies to determine a line or lines which best divide salmon of Canadian and United States origin."

The program of the commission has been set up to include four main projects:

A study will be made of the oceanic distribution of the salmon populations of the North Pacific. This will involve detailed study of the data developed by the Japanese offshore fishery. In addition, it will require special fishing by research vessels to determine how and where to catch salmon on the high seas for study. Two Japanese vessels and from two to five United States vessels will be engaged in this work. Scientific observers will be exchanged between the national groups.

The second study will involve physiological measurements in an effort to determine if there are consistent differences between the two continental stocks.

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 ABSTRACTER: Roy C. Stevens

BRITISH FISHERMEN'S SCHOOL

BROWNING REACTIONS

FISH POISONS

PROGRAM OF NEW FISHERIES COMMISSION

0.33

relative humidity and temperature on browning as estimated by the optical densities of diluted reaction-mixtures at 430 mμ. At both 25° and 60° C. the peak was at a lower relative humidity than the 70% relative humidity peak for simple glucose-casein mixtures reported by Lea and Hannan (1949). Figure 2 shows a plot of browning at different concentrations of nitrogen as calculated from water uptake/relative humidity data obtained at a 100 mg. extractive level in other experiments at 60° C.

To determine the effect of temperature, aliquots of freeze-dried extractive with a drop of chloroform to inhibit bacterial growth were allowed to react in sealed tubes at different temperatures. Table 1, below, shows that browning is highly dependent on temperature under these conditions. The values relate to initial linear sections of browning/time curves. These values give an approximately linear plot for $\log_{10}$ browning rate/reciprocal of absolute temperature.

Table 1. 'Browning' at Different Temperatures

Temperature (° C.)	Units optical density increase/hr.
0°	$2{\cdot}97 \times 10^{-4}$
15°	$6{\cdot}30 \times 10^{-4}$
37°	$2{\cdot}00 \times 10^{-3}$
60°	$3{\cdot}01 \times 10^{-1}$

Solutions of the extractive were found to be at pH 6.8 and strongly buffered. Preliminary findings indicated that maximum browning of the extractive occurs at pH 7 at 60° C., whereas, maximum browning of simple sugar-amino acid and sugar-protein mixtures occurs at a different pH. The behavior of simple sugar-amino acid and sugar-protein mixtures can be accounted for by a loss of reactive volatile amine from the reaction phase at higher pH levels.

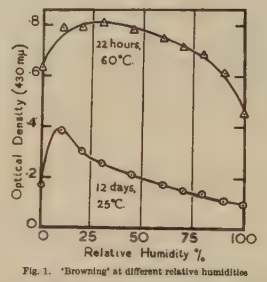

Fig. 1. 'Browning' at different relative humidities

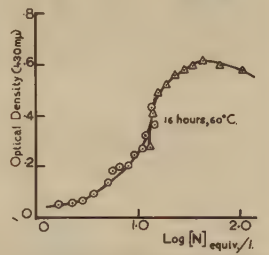

Fig. 2. 'Browning' at different concentrations of reactants

9.4 (Cross Reference: 1.30)

The third phase of the work is tagging, and several vessels from Japan and several from the United States will be engaged in this work. Canadian scientists will participate by studying means of tagging immature seaward migrants.

The fourth phase will have to do with the oceanographic aspect. All three nations will participate in collecting and studying data on currents; plankton and food centers; water temperature, color and transparency; and meteorological data.

The commission will also undertake a scientific study of the king crab population in convention waters.

9.7

screen in front on which films of harbors, channels, and buoys could be projected by a camera connected to the wheel; decks built to resemble actual trawler and drifter decks with winches, capstans, bollards, and fishing gear; and all modern methods of navigation and fish-detecting devices. Training would include electrical and wireless, cookery -- with a ship's cookhouse and classroom attached -- rigging and workshops for teaching repairs which could be done at sea, avoiding a return to port for such repairs.

9.15

The purple flowered mateshuwa was considered to be the most potent fish poison in the area in which it was found. Mateshuwa is used by crushing the freshly gathered plant (stems, leaves and flowers) between rocks in a dammed off slowly flowing part of a stream. A few arm loads of the plants are claimed to be sufficient to stun the fish and cause them to rise to the surface 100 yards downstream. The poisoned fish may be eaten without danger.

Pressed specimens of mateshuwa have been identified as Gilia macombii, Torrey, a species that has not previously been reported as a fish poison of any ethnic group. A filtered cold water extract made from powdered dried mateshuwa in a concentration of 1 mg./ml. was sufficient to stun goldfish weighing 3 to 5 grams in 10 minutes and to kill them in less than 15 minutes. An extract made from the dried plant in a concentration of 0.2 mg./ml. was sufficient to kill the goldfish in 2 to 2 1/2 hours.

4.3

DENSITIES AND VISCOSITIES OF TRICHLOROETHYLENE MISCELLAS OF COTTONSEED OIL, FISH OIL, AND BEEF TALLOW

Arnold, Lionel K.; Juhl, William G.; and Arvidson, Harold C.
Journal of the American Oil Chemists' Society XXXI, No. 9, 393-394 (September 1954)

This paper reports data on the densities and viscosities of trichloroethylene miscellas of cottonseed oil, fish oil, and beef tallow at 4 different temperatures.

A crude cottonseed oil was obtained by the extraction of prime cottonseed with trichloroethylene. The oil had a density of 0.932 at 25°C., an iodine number of 112, and a free fatty acid content of 1.1%. A fish oil was obtained by the extraction of California mixed fish scrap with trichloroethylene. This oil had a density of 0.951 at 25°C. The miscellas used for obtaining data were produced by direct dilution of the concentrated miscella obtained by extraction instead of by dilution of stripped oil. Beef tallow was obtained by the extraction of dry rendered meat and bone scrap with trichloroethylene. As with fish oil, concentrated miscella rather than tallow was used in making up the miscellas. The densities and viscosities of the various miscellas were determined at 25°, 35°, 50°, and 70°C. The viscosities were determined with an Ostwald pipette that had a water constant of 0.0011983 at 25°C. Densities were determined in 25 cc. pycnometers maintained at the desired temperature within ± 0.02° C. in a thermostatically-controlled water bath.

The results in table 1 (this card, over) show that the viscosities in centipoises, μ, are related to the temperature, t, in °C. and the weight fraction of the oil in the mixture, x, by the equation $\log \mu = ax - b$, where a and b are functions of the temperature. Equations for calculating a and b are given in table 2 (this card, over). The general equation is accurate within ± 2% for miscellas containing up to 40% cottonseed oil, and accurate to within ± 4% for miscellas containing up to 30% fish oil or tallow.

(over)

 ABSTRACTER: Martin Heerdt

2.8

COMPOSITION OF COOKED FISH DISHES

Lee, Charles F.
U. S. Department of the Interior, Fish and Wildlife Service, Circular 29 (1954)

Data are tabulated in table 1 (omitted) for the proximate composition, energy value, and size of serving portion for a large number of different cooked or prepared dishes containing fish or shellfish. Table 1 also includes data on the protein, fat, carbohydrate content, and energy value, on a serving-portion basis.

The analyses in table 1 have been classified according to the species of fish or shellfish used. A classification of dishes according to their protein content is of greater nutritional significance, and a general descriptive grouping by type of dish and recipe name within 4 ranges of protein content between the extremes of 3 to 28 percent has been indicated.

Recipe information, as regards ingredients used in amounts of more than 1 tablespoon, is listed in table 2 (omitted).

This 31-page booklet is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. at a price of 25 cents.

 ABSTRACTER: Charles F. Lee

2.1121

OTTER-TRAWL MESH EXPERIMENTS WITH DOVER SOLE

Westrheim, Sigurd J. (Fish Commission of Oregon, Astoria, Oregon)
Progressive Fish Culturist 16, No. 4, 184-185 (October 1954)

The three Pacific Coast States of Washington, Oregon, and California, working under the auspices of the Pacific Marine Fisheries Commission, a coordinating body for mutual fishery problems of the three States, conducted cooperative trawl-mesh experiments designed to determine a mesh size that would minimize the waste of young Dover sole at sea.

In the catches made with experimental nets aboard a vessel of the California Fish and Game Department, only 31 percent of the fish taken with a 3-inch mesh were marketable, whereas 98 percent of those taken with a 4.5-inch mesh were of marketable size. As a result of these and some earlier studies, a minimum mesh size of 4.5 inches was adopted by the Fish Commission of Oregon to become effective in 1954.

The average discard of Dover sole by Oregon's commercial vessels in 1953 was estimated to be 25 percent. At that rate, 5.5 million small Dover sole were destroyed during the seven-year period from 1946 to 1952. Most of these discarded fish would have reached marketable size in two or three years, and were capable of doubling their weight in 5 years. The new minimum-mesh-size regulation is therefore expected to bring about a much more economical utilization of the fishery resource.

 ABSTRACTER: Roy C. Stevens

2.06

ICE FROM FRESH WATER AND ICE FROM SEA-WATER

LeDanois, E.
Rev. gen. Froid 29, 475-79 (1952)
Food Science Abstracts 26, No. 5, 508 (September 1954)

Difficulties which may be encountered in using freshwater ice for chilling fish are discussed. The commercial production of sea-water ice is possible, but the salt content of the ice is only 1.2%. Experiments with sea-water ice for the transport of fish were carried out in 1921, with satisfactory results, but these experiments were not followed up. In 1949, the Ateliers et Chantiers de la Loire developed a process of obtaining sea-water ice which does not crumble and has a salt content about 1%; the ice is made in sheets. Another manufacturing process was developed by Etablissements Trepaud. The author believes that sea-water, either as refrigerated brine or ice, is the best storage medium for fish.

MAKING ICE WITH SEA-WATER. MODERN PROCESSES

Anonymous
Rev. gen. Froid 28, 609-11 (1951)
Food Science Abstracts 26, No. 5, 508 (September 1954)

Apparatus used in the Trepaud method for making ice from sea-water, with a tubular generator for cylindrical blocks of ice, is described. The production cycle includes 3 stages: freezing, stripping, and refilling. The ice is of good quality, and contains 12.1 g. of salt per l.; sea-water contains 39.6 g. per l.

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TRICHLOROETHYLENE MISCELLAS

TRAWL MESH SIZE REGULATIONS

COMPOSITION OF COOKED FISH DISHES

SEA-WATER ICE

2.1121 (Cross Reference: 9.17)

4.3

The equation for calculating density is also given in table 2 by the equation D = mt + n in which D = density in grams per cc. of m and n. The values obtained by using this equation have an accuracy of ± 1% for miscellas containing up to 60% cottonseed oil and 40% fish oil or tallow.

The use of trichloroethylene as a solvent in these experiments should not be taken as a recommendation by the authors that the products obtained from this extraction are or are not suitable as a feed.

TABLE II

Equations for Calculating Viscosities and Densities of Fat-Trichloroethylene Miscellas

Viscosity, centipoises $\log \mu = ax - b$	Density, gr. per cc. $D = mt + n$
Cottonseed Oil	
$a = 2.24 - 0.0094\ t$	$m = -0.00167 + 0.0021x - 0.0013x^2$
$b = 0.1864 - 0.00353\ t$	$n = 1.4905 - 0.7543x + 0.1931x^2$
Accuracy ± 2%, to 40% oil	Accuracy ± 1%, to 60% oil
Fish Oil	
$a = 2.37 - .0104\ t$	$m = -0.00167 + 0.0021x - 0.0013x^2$
$b = .133 + .0036\ t$	$n = 1.4905 - 0.7543x + 0.1931x^2$
Accuracy ± 4%, to 30% oil	Accuracy ± 1%, to 40% oil
Beef Tallow	
$a = 2.26 - .0104\ t$	$m = -0.00167 + 0.0021x - 0.0013x^2$
$b = .133 + .0036\ t$	$n = 1.4905 - 0.8100x + 0.1931x^2$
Accuracy ± 4%, to 30% tallow	Accuracy ± 1%, to 40% tallow

TABLE I

Densities and Viscosities of Various Fat-Trichloroethylene Miscellas

Miscella Concentration % fat	Viscosity Centipoises				Density Gr. per cc.			
Cottonseed Oil								
	Temperature °C.				Temperature °C.			
	25	35	50	70	25	35	50	70
0.00	0.590	0.543	0.486	0.419	1.456	1.438	1.412	1.379
5.37	0.749	0.682	0.596	0.501	1.413	1.403	1.379	1.350
9.94	0.959	0.856	0.731	0.596	1.379	1.361	1.339	1.308
15.07	1.233	1.092	0.910	0.728	1.341	1.325	1.307	1.280
19.94	1.547	1.353	1.121	0.883	1.306	1.293	1.274	1.250
30.03	2.405	2.053	1.648	1.283	1.248	1.237	1.219	1.200
34.88	2.953	2.462	1.989	1.484	1.208	1.196	1.179	1.157
39.91	3.789	3.140	2.436	1.791	1.187	1.176	1.160	1.139
58.97	8.664	6.793	4.943	3.436	1.096	1.087	1.078	1.058
100.00	63.12	41.40	24.15	12.44	0.932	0.925	0.913	0.902
Fish Oil								
	Temperature °C.				Temperature °C.			
	25	40	55	70	25	40	55	70
0.00	0.603	0.525	0.466	0.416	1.455	1.437	1.400	1.381
2.02	0.648	0.568	0.504	0.443	1.439	1.421	1.390	1.364
8.73	0.916	0.770	0.667	0.563	1.386	1.370	1.344	1.324
14.55	1.240	1.033	0.867	0.718	1.345	1.330	1.300	1.284
18.55	1.550	1.253	1.051	0.864	1.319	1.305	1.280	1.259
25.10	2.082	1.654	1.342	1.090	1.285	1.273	1.250	1.229
29.94	2.715	2.105	1.671	1.364	1.254	1.239	1.222	1.202
40.20	5.188	3.732	2.765	2.153	1.191	1.179	1.165	1.144
Beef Tallow								
	Temperature °C.				Temperature °C.			
	25	40	55	70	25	40	55	70
0.00	0.603	0.525	0.466	0.416	1.455	1.437	1.400	1.381
5.26	0.744	0.645	0.568	0.484	1.411	1.395	1.365	1.342
11.86	0.886	0.818	0.704	0.590	1.368	1.350	1.323	1.300
17.40	1.298	1.065	0.905	0.754	1.321	1.308	1.281	1.259
20.67	1.574	1.265	1.056	0.889	1.294	1.283	1.257	1.233
26.77	2.105	1.595	1.334	1.087	1.253	1.243	1.218	1.198
30.47	2.498	1.888	1.554	1.258	1.231	1.220	1.196	1.175
39.99	3.872	2.731	2.212	1.751	1.172	1.168	1.141	1.125

2.8 (Cross References: 0.7, 8.50)

3.234 NEW TECHNIQUE OF FREEZING SHRIMP AT SEA

Mingledorff, W. L.
Fishing Gazette 71, No. 11, 52; and No. 12, 50 (November and December 1954)

Experiments were conducted in an effort to develop a more satisfactory method of freezing shrimp at sea. Using a freezing solution of sugar and salt it was found that shrimp could be frozen at 0° F. to 5° F. in 15 minutes or less depending upon the amount of agitation of the solution. The shrimp thus frozen showed no tendency to stick together and remained in that condition during 60 days of storage in a large freezer room when left in an open cardboard master carton. Most important was the fact that there was no visual or measurable sign of dehydration. When thawed after the 60 days of storage the shrimp were said to have the appearance of freshly-caught shrimp. The holding qualities of the shrimp are attributed to the fact that the sugar in the solution makes a thin syrup that forms a glaze which will not recrystallize in storage. It is believed that this property is due to the hygroscopic nature of the sugar.

The system as installed on a fishing vessel consists of a freezing tank approximately 4 feet 6 inches wide, 7 feet 1 inch long, and 4 feet high. The tank is lined on the inside with stainless steel and contains the freezing plates and solution. The solution is circulated through the plates and through the shrimp by a hydraulically driven propeller. Refrigeration is supplied by a diesel-driven unit approximately 6 feet long, 2 feet wide, and 5 feet high. The foregoing equipment is all located on deck. The cargo hold is converted to a frozen storage room by use of plates and another diesel-driven unit slightly smaller than the freezing unit.

The handling procedure used on the boat is as follows: On completion of a drag, the shrimp are headed and thoroughly washed. They are then weighed into 50-pound lots and dumped into special

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 ABSTRACTER: Roy C. Stevens

3.18 SOME PRINCIPLES OF SANITATION, BOTH ON VESSELS AND IN PLANTS

Thibadeau, A. T.
Fishing Gazette 71, No. 9, 48, 52, 54 (September 1954)

Several factors must be considered in selecting materials and methods of cleaning -- the soil to be removed (baked-on deposits, grease, corrosion, scale, rust, old paint); the surface to be cleaned; the condition of the water available for cleaning; the heating facilities of the plant; the time permitted by production schedules; the nature of the equipment to be cleaned; the cleaning equipment available or that may be easily constructed.

Soap as a cleaning material has several disadvantages. It has a tendency to react with the magnesium and calcium salts in water to form a sticky, insoluble deposit that must itself be cleaned off. Raw alkalis are dangerous to workers and metals and are difficult to control.

Many new materials have been developed that are designed to do a certain specific cleaning job. Most of these are compounded of wetting agents, surface active agents, and emulsifying agents. Some are alkaline, designed to remove fats, grease, oil, and similar soils. Some are acidic, designed to remove scale, corrosion, and stains. One of the alkaline detergents used widely in the fishing industry destroys odors as it cleans. Another combines the cleaning and deodorizing functions with germicidal ability. It inhibits the growth of molds and fungi.

The method by which the cleaning material is applied is very important. If a cleaning tank is to be used, facilities should be provided for heating and agitating the solution at the same time. The material of which the tank is to be made must be considered in the light of the type of cleaning

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 ABSTRACTER: Roy C. Stevens

3.234 BRINE-FREEZING TUNA AT SEA-- AND HOW REFRIGERATED FISH ARE THAWED FOR UNLOADING AT THE CANNERY FLUMES. I. FREEZING

Stevens, Garnet W.
Pacific Fisherman 52, No. 12. 44 (November 1954)

After the well on a tuna vessel is packed with fish, it should be refilled completely with seawater, to which is added three-quarters of a sack of salt for each ton of fish in the well. The brine temperature is then lowered to 23° F. and held at that point for 72 hours before the well is dried.

Some engineers vary the amount of salt, using a salinometer, but there must be sufficient salt to permit bringing brine temperature down to 23°, and there is a 2° difference between the brine and fish temperature.

When the temperature is being lowered in the well, the engineer will notice that the temperature will stand at 25° for 24 hours or more, depending on the amount of compressors he has on the line; but when the temperature starts to drop it will go down to the 23° mark and stay there if the proper amount of salt has been added.

After 72 hours, the brine is pumped over the side and the well is held on the dry suction. The back pressure on the dry suction line should be held at 15 lbs. pressure without a regulator. This will give 0° ammonia in the coils and will allow for a 10° difference between the ammonia and fish temperatures, a minimum allowance for a dry well. Some engineers hold their wells on a back pressure regulator at higher suction pressure, up to 28 lbs., but this should not be done as there is no safety factor and it may cause sagging wells or stinkers. A 15 lbs. straight suction is the best for all-around handling of temperatures.

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3.234 BRINE-FREEZING TUNA AT SEA -- AND HOW REFRIGERATED FISH ARE THAWED FOR UNLOADING AT THE CANNERY FLUMES. II. THAWING

Stevens, Garnet W.
Pacific Fisherman 52, No. 12, 44 (November 1954)

The instructions for raising the temperature to the desired range are as follows: If the unloading schedule is known, (say the boat holds 300 tons and the unloading rate is 100 tons per day) the engineer will start to raise the temperature in the first four wells to be unloaded by shutting off the refrigeration on these four wells not more than 8 hours ahead of time. After a well cover is removed, if the rack in the well is still bowed as when the brine was removed from the well, there should be no trouble, as the well temperature will be 15° or below. The engineer will now flood the well with bait water, allowing it to overflow, and the water to run over one minute for each ton of fish in the well. The average is about 20 minutes.

When the water has overflowed the number of minutes required, the bait water is shut off and the brine circulator is started on that well and salt added without delay. The same amount of salt should be added as was used to lower the well temperature originally. (This additional salt maintains uniform thawing temperatures throughout the well, and tends to assure uniform moisture content in the fish flesh as well as to lighten the flesh color.) Repeat the process for each well. Allow the solution to circulate for the first 24 hours without adding any more water except the small amount required to keep the well full.

After this 24-hour circulation period, if the brine is 27°, no more water should be added at this time. If the brine is 26°, add small amounts of water, and if 25° or below, larger amounts of water should be added to the well, overflowing the well for approximately 3 to 5 minutes. Then another 24

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FREEZING SHRIMP AT SEA

BRINE-FREEZING TUNA

PLANT SANITATION

THAWING BRINE-FROZEN TUNA

3.234 (Cross Reference: 1.1)

When the temperature of a fish is lowered from 29° to 27°, it requires only the removal of one BTU per pound of weight in the fish per degree of change, but when the internal temperature of the fish has been lowered to 27°, it takes 144 BTU of heat per pound of fish to change it from a firm fish to one frozen solid. The amount that the temperature is lowered after this is only a safety factor in the storage of the fish, and allows more repair time if the refrigeration should break down.

When the time comes to thaw-out the fish and unload the boat at the proper controlled brine temperatures of either 29°, 29 1/2°, or 30° F., the fish will be found to be at 27°, or 27 1/2° internal temperature, still firm, but the belly can just be cut.

3.234 (Cross Reference: 1.1)

hours period is allowed for the temperature to raise, at which time the brine temperature should be 28° F. Now add small amounts of water with either the deck hose or bait valve to bring the brine to 33°.

Allowing the 33° brine to circulate should lower its temperature to between 29° and 30°, which is the ideal reading the night before unloading. This 29° to 30° temperature must stand for at least 6 hours prior to unloading so that the engineer may determine when the fish have reached an internal temperature of 27° to 27 1/2°. The loins of the fish will be firm, with the belly just soft enough to cut. There will be a 1/2° change in the fish temperature from the boat to the butchering table.

Sagging wells are caused from drying the wells too fast and not allowing time to remove all the heat; or are caused by the coils not being properly frosted after the well has been dried. Leaking wells or wells that will not hold brine should be worked at a shorter period, such as overflowing the well for one hour, adding the salt, and circulating the brine for 12 hours. The make-up water that is added to keep the well full is sufficient to have the fish come out at the desired temperature.

3.234 (Cross Reference: 1.85)

stainless steel wire baskets. The baskets are placed in the tank in guides that hold them in place. After 15 minutes the shrimp are completely frozen and the baskets are taken out and tilted to drain. The shrimp are then dumped into baskets and placed in the storage room, which is held at 0° F. by overhead plates. At the end of the day or at the crew's convenience, the shrimp in the baskets are placed into 50-pound master cartons. No further handling is necessary until the shrimp are unloaded.

The second part of the article compares this method with the more conventional method used on other freezer vessels.

3.18

solution that is to be used in it. The tank must be large enough to handle the largest size work generally cleaned.

Because heat intensifies cleaning ability, the type of heating system to be used with the tank should be given careful consideration. The advantages or disadvantages of various types of heating are discussed.

Drains should be provided to skim the oil and grease off the top of the cleaning solution and at the bottom to drain off the spent solution. Insulation around the outside of the tank will help to prevent heat loss. An overhead hoist will save time and energy in handling heavy work.

The washing machine, although used less frequently in the fishing industry than the tank method, is the fastest cleaning method because it combines the mechanical force of spray jets or paddle wheels with the heat and chemical action of the cleaning solution. Washing machines are now being used to wash cans before labelling; to clean fish baskets, racks, trays, and offal drums.

Before selecting a machine for the job, the following factors should be considered: (1) the floor space which the machine will occupy; (2) the heat required to keep the solution and rinse water at the proper temperature; (3) the amount of water consumed; (4) the power needed to operate the conveyor and to pump the solution and rinse water; and (5) the labor required to operate and maintain the machine.

3.18 CONTAMINATION OF FOOD BY METALS

Urschel, Joe
Canner 119, No. 24, 21-22, 46 (December 13, 1954)

Generally speaking, there are three principal forms of food contamination by metal. These forms, which may occur alone or in combination, are: (1) corrosion of the metal by the food product itself, (2) electrolysis between two dissimilar metals and, (3) mechanical contamination by abrasion or wear.

The most common and yet the most serious form of contamination is due to corrosion of the metal by the product or the dissolving of the metal into the product. The most common metals used in the manufacture of food processing machinery are alloys of aluminum, iron or copper. None of these metals in small amounts can be considered dangerous or injurious to health. However, the addition of some of them can have a contributing side effect to the production of undesirable food products. For instance, iron salts will cause brown or black discoloration of food that is not desirable from the standpoint of appearance. Copper salts may have the effect of destroying some vitamins or breaking down fats, or discoloring the product.

Aluminum alloys will dissolve rather rapidly in both alkaline and acid solutions. In addition, aluminum alloys may enter a product in the form of fine particles resulting from abrasion against other materials. From the standpoint of electrolysis, aluminum is one of the most serious elements to consider when placing against other metals. However, aluminum can safely be used in a wide range of applications where these conditions do not exist.

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 ABSTRACTER: Roy C. Stevens

2.119 POWER DORIES FOR LONGLINING

Anonymous
Fishing Gazette 71, No. 12, 34-35 (December 1954)

A Nova Scotia dory schooner recently sailed for the Atlantic fishing banks with four power dories aboard instead of the usual twelve dories that are rowed by their two-man crews in fishing operations. The power dories will continue to use only a two-man crew but they are expected to be able to as much as triple the catch of fish taken by present longlining methods. This experiment is the result of research carried on during the past year by Canadian fisheries departments.

The power dory with its power take-off to a "gurdy" or line-hauler is expected to make fishing possible at depths greater than with the usual dory where lines are hauled in by hand. Should the experiment prove successful, it will mean less men needed for crews and the possibility of catches greater than those taken by the twelve dories used at the present time. This will mean a greater share per man when the fish is sold.

The four power dories, powered with 20-25-h. p. engines, cost approximately $2,500 each. They are about twenty-three feet in length with a beam of about seven and one-half feet.

Each dory is expected to fish about twelve tubs of trawl per day, compared with an average of about four for the old style dory. Each tub of trawl contains twelve lines of fifty fathoms length which are set from the dory and marked with buoys. When all the lines have been set, the dorymen return to the first line and begin hauling them in in order. Using the gurdy to haul the lines, they are expected to be able to fish at a greater depth than before, and thus catch the larger cod which are said to exist there in abundance.

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 ABSTRACTER: Roy C. Stevens

2.06 THE CHILLING OF FISH IN COOLED SEA-WATER

Le Danois, E.
Rev. gen. Froid 29, 369-375 (1952)
Food Science Abstracts 26, No. 5, 508 (September 1954)

Clean and pure sea-water with a suitable salt content (about 35%) is considered to be an excellent medium for the chilling of fish. Reference is made to the author's early experiments in France, using the Larsen process (immersion at 2° C., then storage at -2° C.) for the preservation of sardines and tunny, and to experiments by Sigurdsson in the United States on the preservation of herring and pilchards in brine. In 1947, at Saint-Jean-de-Luz, sardines for subsequent canning were preserved in a fresh state for 6 hours by immersion in sea-water with a salt content of 35%, at -3° C. A process for using sea-water instead of ice on trawlers for preserving sardines and herring is described.

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3.33 IN-CAN CHUNKING MACHINE FOR TUNA

Anonymous
Pacific Fisherman 53, No. 1, 51 (January 1955)

As a result of a study of the various chunk packs and their appearance on cutting, a machine has been developed that is designed to chunk solid tuna right in the can. In most modern tuna canneries, chunks are ordinarily produced by cutting the fish in stainless steel belts, using various types of blades. The chunks are then generally packed into cans by compression, using automatic packing machines.

The inventor believes that by chunking the tuna immediately in the can, handling can be reduced and that a speed can be maintained that is suitable for efficient mass production and high quality.

By adjustment of the two sets of blades in the machine, it is believed that it will be possible not only to chunk in the can but to dice or shred tuna or salmon. It is stated that chunking in the can, before oil and salt are added, increases a desirable absorption of the oil by the tuna.

 ABSTRACTER: Roy C. Stevens

3.33 (Cross Reference: 1.1)

3.18 (Cross Reference: 3.338)

The properties of a number of alloys of these metals are treated by the author. He states that it has been his observation that most corrosion has taken place in plants where equipment has not been properly cleaned after each operating period. For example, small pieces of potato permitted to remain in a machine after the operating period is completed will sour, creating highly corrosive acids. Many food products which in their natural state are non-corrosive, if allowed to stand, may become corrosive through oxidative changes or through concentration due to evaporation.

To avoid contamination by such means, large quantities of water should be run through the equipment after each period of operation in order to dissolve away any sugars, salts or acids that may have accumulated.

2.119

The dories are carried in separate cradles on the deck of the schooner. The cradles are set to run on tracks so that the boats can be maneuvered into position for launching or storing. Booms to lift the dories have been fitted to the main and fore masts of the schooner.

1.0143 ICELAND AND HER FISHING INDUSTRY

Olafsson, David (Director of Fisheries, Reykjavik, Iceland)
World Fishing 3, No. 12, 438-442 (December 1954)

The economy of Iceland is based almost entirely on its fisheries. Located in an area in which the warm waters of the Gulf Stream intermix with the cold currents of the Arctic regions, Iceland's fishing grounds are some of the richest known.

Of the many species of fish taken in the fisheries, cod and herring are by far the most important. Other species of varying importance are redfish, coalfish, haddock and catfish, besides various species of flatfish, including plaice, halibut and lemon sole.

The main codfishing season (including haddock, ling and saithe) begins the first part of January and lasts until the end of May. The fishing is carried out off the south and west coasts of Iceland by vessels of all sizes from large ocean-going trawlers down to small open motor vessels. The gear used includes the otter trawl, longline and gill nets. The fishery is participated in by 400 Icelandic vessels besides several hundreds of foreign vessels. Longlining and gill netting are conducted mainly inshore whereas the big trawlers operate in deeper waters farther off the coast. At the end of the spawning season the fish disperse and are no longer found in large concentrations.

The herring season extends through the months of July and August. At this time the fish are concentrated in great numbers off the north and east coasts of Iceland but the abundance may vary considerably from year to year. As a result of a decrease in the abundance of herring over the past few years a joint research program has been undertaken by scientists from Iceland, Norway, and Denmark. The results gathered from this research have given important clues as to the habits of

(over)

 ABSTRACTER: Roy C. Stevens

4.99 STUDIES ON ENCEPHALOMALACIA IN THE CHICK. 3. THE INFLUENCE OF FEEDING OR INJECTING VARIOUS TOCOPHEROLS OR OTHER ANTIOXIDANTS ON THE INCIDENCE OF ENCEPHALOMALACIA

Bunnell, R. H.; Matterson, L. D.; Singsen, E. P.; Potter, L. M.; Kozeff, Anna; and Jungherr, E. L. (University of Connecticut, Storrs)
Poultry Science 33, No. 5, 1046 (September 1954)

Several antioxidants were tested and compared with N, N' diphenyl-p-phenylenediamine as to their effectiveness in preventing encephalomalacia in the chick. These antioxidants were mixed directly into a semi-purified ration containing 2% fish oil as a stress factor. Santoquin, 2, 5 dibutyl and 2, 5 diamylhydroquinones, and N, N' disecondary butyl-p-phenylenediamine compared favorably with DPPD. A few were partially effective, while others, such as BHA, were completely ineffective.

The comparative insolubility of DPPD and the observation that there is little or no detectable absorption of this compound from the intestinal tract tend to focus attention on the latter organ as the primary site of action. Intramuscular injections of DPPD were therefore tried in order to determine the effectiveness of this compound when administered by an alternate route. Twice-weekly injections of a suspension of DPPD in Tween 80 gave complete protection against encephalomalacia. This fact lends support to the view that DPPD functions in vivo as an antioxidant.

A water-soluble form of alpha tocopherol and Tween 80 emulsions of alpha and gamma tocopherol were also effective when administered by injection, while delta tocopherol was ineffective. By the injection route, DPPD was found equivalent on a molar basis to alpha tocopherol in preventing encephalomalacia.

 Reprinted in whole

4.13 SOUTH AFRICAN PILCHARD OIL. 4. THE ISOLATION AND STRUCTURE OF A HEXADECATETRAENOIC ACID FROM SOUTH AFRICAN PILCHARD OIL

Silk, M. H. and Hahn, H. H. (National Chemical Research Laboratory, Pretoria, South Africa)
Biochemical Journal 57, No. 4, 582 (August 1954)

By applying the techniques of lithium soap-acetone segregation, urea complex fractionation and molecular distillation to the total fatty acids of pilchard oil, it was shown that a C_{16} tetraene acid was present. This acid was isolated on a preparative scale by reversed-phase partition chromatography. The acid was a pale yellow oil of refractive index N_D^{29} 1.4870. The carbon content was 77.1 percent and the hydrogen content was 9.9 percent. The number of double bonds per molecule was found to be 3.96 and the equivalent weight was 250. Complete hydrogenation of the isolated acid yielded a product that was shown to be palmitic acid.

The ultraviolet absorption of the C_{16} tetraene acid indicated that the acid was not conjugated. After the acid had been subjected to alkali-isomerization, its ultraviolet absorption had the three peaks characteristic of a conjugated tetraene. From this evidence it was inferred that the C_{16} tetraene had each of its double bonds separated by a single methylene group.

The C_{16} tetraene was subjected to permanganate oxidation. The crystalline dibasic acids obtained by this oxidation were separated by paper chromatography. Adipic acid was the main oxidation product although glutaric acid was also found to be formed.

Finally, the infrared spectra indicated that the C_{16} tetraene molecule had a terminal vinyl group.

(over)

 ABSTRACTER: W. N. Sumerwell

4.15 COMPONENT FATTY ACIDS OF MARINE FISH LIVER OILS

Pathak, S. P. and Suwal, P. N. (Department of Industrial Chemistry, Banaras Hindu University, Banaras, India)
Journal of the American Oil Chemists' Society 31, No. 8, 332 (August 1954)

The elasmobranch fish liver oils have been classified into four groups. The first three groups differ in their content of unsaturated fatty acids, both from the standpoint of proportions present and degree of unsaturation. However, all three groups contain approximately 20 percent saturated fatty acids.

The fourth group of liver oils are characterized by their high content of saturated fatty acids. Two liver oils of this group, Carcharias melanopterus and Pristis cuspidatus, are analyzed for their content of saturated and unsaturated fatty acids.

The two oils were hydrolyzed with potassium hydroxide in ethyl alcohol and the total fatty acids were obtained. The fatty acids were first fractionated into three fractions of varying degree of unsaturation by the lithium salt-acetone method and by the Hilditch modified lead salt-alcohol method.

Each of the three fractions was converted to the methyl ester and then fractionally distilled through a Longenecker E. H. P. column. The mean unsaturation and mean molecular weight of each of the fractions obtained by distillation were determined. The composition of each of the ester fractions was calculated from the saponification equivalent and iodine value according to the method of Hilditch.

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 ABSTRACTER: W. N. Sumerwell

FISHING INDUSTRY OF ICELAND

STRUCTURE OF PILCHARD OIL FRACTION

ENCEPHALOMALACIA IN CHICKS

FATTY ACIDS OF SHARK-LIVER OILS

4.13 (Cross Reference: 1.2)

From the results of all the data obtained it was possible to assign to the C_{16} tetraene the structure hexadeca-6:9:12:15-tetraenoic acid.

4.15 (Cross Reference: 1.79)

Carcharias melanopterus liver oil contains 31.1 percent saturated fatty acids (myristic 3.1, palmitic 18.4, stearic 9.5 and arachidic 0.1). The 68.9 percent content of unsaturated fatty acids consists of C_{16} 10.8, C_{18} 19.7, C_{20} 15.2, C_{22} 17.1, C_{24} 5.3 and traces of C_{14} monoethenoid.

Pristis cuspidatus liver oil contains 36.9 percent saturated fatty acids (myristic 1.2, palmitic 22.9, stearic 12.7, and arachidic 0.1 percent). The 67.1 percent content of unsaturated fatty acids consists of C_{16} 8.2, C_{18} 28.5, C_{20} 16.4, C_{22} 5.2, C_{24} 4.6, and traces of C_{14} monoethenoid.

1.0143

the herring and may lead to a full solution of the problem.

In recent years a fishery for redfish has developed that has given the trawlers an important addition to their activities. This fishery takes place during early summer and autumn.

In order to protect the declining stocks of fish in Icelandic waters, that Government, in May of 1952, imposed a limit of four miles off a base line drawn between the outermost points of the north coast. This prohibits all fishing by foreign vessels and also all trawling and Danish seining by Icelandic vessels inside these limits.

At the end of 1953 the Icelandic fishing fleet was composed of 53 trawlers and 55 other vessels of over 100 gross tons, and 511 of less than 100 gross tons. Total tonnage was 57,887, as compared with 27,900 at the end of the war.

0.38 PROTEASES IN STOMACHS OF MARINE MAMMALS. V.

Takaoka, Michi; Ishihara, Yoshio; and Maeda, Masaru
J. Chem. Soc. Japan, Pure Chem. Sect. 70, 406-8 (1949)
Chemical Abstracts 45, No. 7, 3088 (April 10, 1951)

0.38 A NEW MALONIC ACID-DECOMPOSING ENZYME CONTAINED IN FISH SKELETAL MUSCLE. PRELIMINARY REPORT

Yamada, Kisaku and Suzuki, Taneko
J. Agr. Chem. Soc. Japan 25, 290 (1951)
Chemical Abstracts 46, No. 11, 5099 (June 10, 1952)

0.38 DISTRIBUTION AND PROPERTIES OF THIAMINASE AMONG VARIOUS ANIMALS

Tatarskaya, R. I.; Fain, F. S.; and Larionova, L. P.
Biokhimiya 16, 305-13 (1951)
Chemical Abstracts 46, No. 1, 190 (January 10, 1952)

0.38 OCCURRENCE OF TYROSINASE IN HORSE AND FISH MELANOMAS

Fitzpatrick, T. B.; Lerner, A. B ; Calkins, E.; and Summerson, W. H.
Proc. Soc. Exptl. Biol. Med. 75, 394-8 (1950)
Chemical Abstracts 45, No. 5, 2036 (March 10, 1951)

1.1 IN-CAN CHUNKING MACHINE FOR TUNA

Anonymous
Pacific Fisherman 53, No. 1, 51 (January 1955)

(Abstract of this article appears under 3.33 page 17)

1.1 BRINE-FREEZING TUNA AT SEA -- AND HOW REFRIGERATED FISH ARE THAWED FOR UNLOADING AT THE CANNERY FLUMES. II. THAWING

Stevens, Garnet W.
Pacific Fisherman 52, No. 12, 44 (November 1954)

(Abstract of this article appears under 3.234 page 15)

1.1 BRINE-FREEZING TUNA AT SEA -- AND HOW REFRIGERATED FISH ARE THAWED FOR UNLOADING AT THE CANNERY FLUMES. I. FREEZING

Stevens, Garnet W.
Pacific Fisherman 52, No. 12, 44 (November 1954)

(Abstract of this article appears under 3.234 page 15)

1.1 STUDIES ON THE GREEN DISCOLORATION OF FROZEN SWORDFISH. II. SOME EXPERIMENTS ON THE CAUSE OF THE DISCOLORATION

Amano, Keishi and Tomiya, Fumica
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 5, 671-687 (1953)

(Abstract of this article appears under 8.50 page 1 - December 1954 issue)

1.1 LIVE BAIT EQUIPMENT

Carlson, C. B.
Pan American Fisherman 9, No. 4, 11 (November 1954)

(Abstract of this article appears under 2.115 page 15 - January 1955 issue)

1.1 EXPERIMENTAL TUNA PURSE SEINING IN THE CENTRAL PACIFIC

Murphy, Garth I. and Niska Edwin
Pan American Fisherman 8, No. 12, 12 (July 1954)

1.2 SOUTH AFRICAN PILCHARD OIL. 4. THE ISOLATION AND STRUCTURE OF A HEXADECATETRAENOIC ACID FROM SOUTH AFRICAN PILCHARD OIL

Silk, M. H. and Hahn, H. H.
Biochemical Journal 57, No. 4, 582 (August 1954)

(Abstract of this article appears under 4.13 page 19)

1.2 NORWEGIAN HERRING PURSE-SEINE TESTS PROVE SUCCESSFUL

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report No. S-214, Seattle, Washington, November 3, 1954)

(Abstract of this article appears under 2.12 page 19 - January 1955 issue)

1.2 THE BEHAVIORS OF THE SARDINE SCHOOLS BY FISH-DETECTOR. II. INFLUENCES OF THE WATER TEMPERATURE WHEN ATTRACTING THE FISH SCHOOLS BY FISHING LIGHT

Owatari, Atsushi and Furuno, Kiyokata
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 11, 1072 (1954) (English summary and figures)

"Sardine schools were not attracted by light when the water temperature did not seem to be suitable for the fish."

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Australian Journal of Marine and Freshwater Research
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Commercial Fisherman
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishermen's News
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Foreign Commerce Weekly
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

2.01 STUDIES ON THE GREEN DISCOLORATION OF FROZEN SWORDFISH. II. SOME EXPERIMENTS ON THE CAUSE OF THE DISCOLORATION

Amano, Keishi and Tomiya, Fumica
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 5, 671-87 (1953)

(Abstract of this article appears under 8.50 page 1 - December 1954 issue)

2.01 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS. IX. SUPPLEMENT ON PUTREFACTION OF SHARK MUSCLE. ON VOLATILE BASE DEVELOPING IN SHARK MUSCLE

Simidu, Wataru; Hibiki, Sigeyuki; and Hujita, Masao
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 8, 882 (1953) (English summary and figures)

2.01 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS. VIII. ON PUTREFACTION OF SQUID MUSCLE

Simidu, Wataru and Hibiki, Sigeyuki
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 8, 877 (1953) (English summary and figures)

"The alkalinity of squid muscle when it is spoiled is chiefly due to the development of large amounts of ammonia and trimethylamine."

2.111 ON THE EFFICACY OF NET PRESERVATIVES (5)

Kawasaki, Giichi; Nishiyama, Sakuzo; and Nakamura, Hideo
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 4, 344 (February 1954) (English summary)

"The preserving efficacy of the new net preservative 'Amirong' against the weakening of cotton twine in the sea is pretty good during an entire high-temperature season."

2.111 MECHANICAL STUDIES OF FISHING NET MATERIALS

Miura, Tetsuo
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 4, 351-365 (February 1954) (English summary and tables)

I. Some information on the tensile strength of netting cord (1)

II. A method of estimating the least in the ten thousand tensile strengths of netting cord

2.111 UREA CONTENT AND AMMONIA FORMATION OF THE MUSCLE OF CARTILAGINOUS FISHES. II.

Suyama, Michizo and Tokuhiro, Tadashi
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 9, 935 (1954) (English summary and tables)

"The muscle of frozen or ice-stored fishes on the market contains about 1.0-2.0% urea and 9-130 mg. % volatile basic nitrogen; fresh fish muscle contains about 6-36 mg. % volatile basic nitrogen."

2.1129 HOW DO FISH SELECT POSITION AND KIND OF THE BAGS WHEN ENTERING INTO "MASU-AMI"? III. FIELD TESTS WITH FLAT-FISHES, EELS AND OTHER MARINE ANIMALS

Miyamoto, Hideaki and Shioda, Eiji
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 11, 1109 (1954) (English summary and tables)

2.1129 ON THE PULL OF FISH CAUGHT BY FISH-HOOK

Ohshima, Yasuo
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 233-38 (1953) (English summary, figures and tables)

2.1129 HOW DO FISH SELECT POSITIONS OF AND MATERIALS FOR THE BAG WHEN ENTERING INTO "MASU-AMI"? I. EXPERIMENTS WITH THE BLACK PORGY, SPARUS SWINHONIS GUNTHER

Miyamoto, Hideaki
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 243-57 (1953) (English summary, figures and tables)

"The present study examined fishing efficiency of the bags depending upon their positions in the net and thread materials used."

2.9 THE OYSTER AS A FOOD AND MEDICINAL

Funari, Renato Marcos V.
Separate (Inst. quim. Campinas S/A, Campinas, Brazil), 1942, 24 pp.
Chemical Abstracts 45, No. 7, 3092 (April 10, 1951)

2.9 PHYSIOLOGICAL AVAILABILITY OF CALCIUM, PHOSPHORUS, AND NITROGEN FROM THE BONES & FLESH OF DILIS, A SMALL FISH USED IN THE FILIPINO DIET

Leverton, Ruth M. and Soledad, Ramos P.
Philippine J. Science 80, 23-32 (1951)
Chemical Abstracts 46, No. 21, 10333 (November 10, 1952)

2.9 FOOD POISONING CAUSED BY EATING ASARI (VENERUPIS SEMIDECUSSATA) AND OYSTER (OSTREA GIGAS) AND STUDIES ON THE TOXIC SUBSTANCE VENERUPIN

Akiba, Tomoichiro and Hattori, Yasuzo
Japan. J. Exptl. Med. 20, 271-84 (1949)
Chemical Abstracts 45, No. 8, 3518 (April 25, 1951)

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3.60 DEHYDRATED MEAT

Anonymous
Canner 119, No. 16, 36 (October 18, 1954)

A dehydrated steak which can be stored on open shelves for two years has been developed by University of California technologists at Davis, California. The successful dehydration of roasts, chops and ground meat by freeze-drying has also been achieved, according to Aloys I. Tappel, assistant professor of food technology. As long as the dehydrated meat is stored in plastic, glass, or metal containers that keep out the air, it will keep at room temperatures for two years, according to Mr. Tappel.

3.60 MICROBIOLOGICAL DETERIORATION OF FISH POST MORTEM, ITS DETECTION AND CONTROL

Tarr, H. L. A.
Bacteriological Reviews 18, No. 1, 1-15 (March 1954)

(Abstract of this article appears under 3.12 page 13 - July 1954 issue)

3.60 DEHYDRATED MEAT

Sharp, J. G. (Compiler)
Food Investigation Special Report No. 57, (H.M.S.O.)

The meat was first trimmed, sliced and cooked, then minced and dehydrated by heated air. The report discusses the theoretical and practical aspects of dehydration, including physical and bacteriological factors, equipment, packaging, and storage.

4.21 STUDIES ON A KIND OF DISCOLORATION OF FISH OIL. VI.

Nonaka, Junsaku
Bulletin of the Japanese Society of Scientific Fisheries 29, No. 10, 1001 (1954) (English summary and table)

'On oxidation with molecular oxygen followed by treatment with gaseous ammonia, saturated n-fatty acids with more than twelve carbon atoms suffer discoloration more intensely with their increasing chain length."

4.21 REACTIONS OF OXYGEN WITH FATTY MATERIAL

Sims, R. P. A.
Can. Chem. Process Inds. 35, 125-9 , 133 (1951)
Chemical Abstracts 45, No. 8, 3615 (April 25, 1951)

4.21 STUDIES ON THE POLYMERIZATION AND OXIDATION OF MARINE ANIMAL OILS - I. PREPARATION OF EDIBLE OIL FROM MARINE ANIMAL OILS

Higashi, Hideo; Murayama, Shigeo; and Tabei, Kikuko
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 537-50 (1953) (English summary, tables and figures)

6.139 FAT EXTRACTION AND ITS INFLUENCE ON THE VITAMIN CONTENT OF THE MEAL

Johannessen, Berit
Meldinger fra SSF, No. 3, 49-52 (May 1954)

Neither hexane nor perchlorethylene caused any destruction of riboflavin or vitamin B_{12} when used in the cold to extract fat from herring meals of known vitamin content. Carbontetrachloride caused no destruction of riboflavin, vitamin B_{12}, or niacin when used to extract fat from herring meals over a period of 2 hours at 70°C.

6.139 SOME OBSERVATIONS ON EXTRACTION AND IODINE VALUES OF FAT FROM FISH TISSUE, PRESS CAKE AND MEAL, AND ON PEROXIDE VALUES OF MEAL FAT THE FIRST DAY

Olafsson, Pall
Timarit Verkfraeoingafelags Islands 38, No. 4 (1953)

(Abstract of this article appears under 6.14 page 9 - November 1954 issue)

6.139 THE HEAT INACTIVATION OF CYSTINE IN SOYBEAN-OIL MEAL

Evans, Robert John; Groschke, A. C.; and Butts, Helen A.
Arch. Biochem. 30, 414-22 (1951)
Chemical Abstracts 45, No. 12, 5208 (June 25, 1951)

6.15 A PROPOSED METHOD FOR ESTIMATING THE AMOUNT OF SOLUBLES ADDED TO WHOLE FISH MEAL -- T.N. NO. 30

Lee, Charles F.
Commercial Fisheries Review 16, No. 9, 21-23 (September 1954)

(Abstract of this article appears under 7.51 page 17 - January 1955 issue)

6.15 A NEW DRY CONCENTRATE FROM FISH SOLUBLES AS FEED MATERIAL

Kirschninck, Heinz
Seifen-Ole-Fette-Wachse 78, 119-20 (1952)
Chemical Abstracts 47, No. 12, 6064 (1953)

6.15 HEAT STABILITY OF B VITAMINS DURING PRESSURE EVAPORATION OF STICKWATER

Anonymous
Meldinger SSF, No. 6, 110-117 (1952)

There was a marked increase in destruction of B vitamins with increased exposure to high temperatures. Results show that, especially at high temperatures, evaporation time should be as short as possible.

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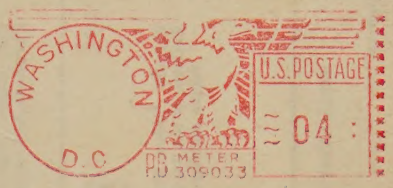

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